

# THE POLAR TIMES



July 2007



## President's Letter

It was great to greet so many old friends and meet new ones in Columbus at the Byrd Polar Research Center/American Polar Society Symposium in April. We heard fine talks on the International Geophysical Year and the International Polar Year. There were many veterans of the IGY present, which event started 50 years ago. BPRC was an excellent host, as usual, and I wish to thank Berry Lyons and his hard working staff, Lynn Everett, Lynn Lay, and Laura Kissel, for all the work they put in to make it a successful gathering.

At the Board of Governors meeting we approved the latest revised constitution and had a good discussion of the various issues facing the APS. Our financial situation is healthy, and *The Polar Times* is doing fine as you can see here. Our new website ([www.ampolarsociety.org](http://www.ampolarsociety.org)) is up and running.

The IPY started on schedule on March 1

and will continue for two years. The U.S. program is primarily supported by the National Science Foundation (NSF), which managed to secure additional funds for the purpose in the Office of Polar Programs, as well as other agencies. However, there is nothing comparable to the step increase in U.S. Antarctic research of the IGY. This is not surprising considering that the programs started in IGY are essentially continuing to this day, although greatly modified and expanded as technology and scientific objectives and accomplishments have evolved.

One of the great concerns facing the world is the problem of anthropogenic climate change and global warming as clearly enunciated by the Fourth Assessment Reports of the Intergovernmental Panel on Climate Change (IPCC) released this year. The polar regions are showing some of the most rapid changes, so our Society should be directly involved. The IPCC report noted that "the last time the polar regions were significantly warmer than the present for an extended period (about

125,000 years ago), reductions in polar ice volume led to 4 to 6 metres of sea level rise." The reductions of NASA and NOAA satellite sensing programs for the earth, and the consequent increased reliance on European and other nations' satellite sensors does not bode well for the vitality of continuing research in the U.S. of this looming global crisis. I urge members to communicate with our Senators and Members of Congress on this vital issue.

John Behrendt

APS President

## Secretary's Letter

As most of you are aware, we convened in Columbus, Ohio, in April for the Byrd Polar Research Center and American Polar Society combined Symposium. Nearly the whole event was put together and conducted by the staff at BPRC, and it could not have gone any smoother or have had any more interesting presentations. I was surprised by how many of those attending were involved on long traverses during IGY and the many in attendance that had wintered at stations that no longer exist, such as Byrd, Ellsworth, Plateau and the Little America stations. Plateau Station is particularly fascinating because during the first winter the staff of eight experienced over 90 days of -100°F or colder. The

whole event was a great mix of general history presentations and science.

As you might be aware that our new web page is up and running at [www.ampolar-society.org](http://www.ampolar-society.org). Unfortunately it is not high on the search engine priority at the moment, but the more hits it receives will help move it up the roster to become more visible. Also, we are looking for creative ways to expand our membership, so if anyone has any good ideas, please let us know.

Kevin Bjella  
Secretary

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## Polar Times Index Now Available

A labor of love by APS Membership Chair Charles Lagerbom—who has spent two years meticulously combing through early issues of *The Polar Times*—has resulted in a comprehensive new Index to Vol. 1, Numbers 1-25 (June 1935-December 1947).

The 98-page Index has already proven indispensable to the staff of *The Polar Times*, and we know it will be of interest not only to researchers and librarians but to all of our readers, too.

Thousands of entries—from Aalesund to Zyryanka River—detail the stories that graced the magazine during its first dozen years. Covered are hundreds of individuals, places, geographical features, expeditions, ships, aircraft, animals, books and article titles, among other subjects.

Charles is working on the second installment that will cover issues 40-102 (1955-1986), and there are plans for a third installment covering the 18 issues from 1993-2001.

Cost for part one of the Index is \$20 per copy, including postage. (Additional cost for airmail.) Contact Charles at the American Polar Society Membership Center, P.O. Box 300, Searsport, ME 04974, or email him at [ampolars@prexar.com](mailto:ampolars@prexar.com). □

## About Our Front Cover

**Adelie Iceberg:** A group of Adelie penguins can often be seen playing and resting on icebergs. This iceberg is a portion of a larger tabular iceberg. Its sharp angular faces show how the ice shears off when the iceberg calves. © Irma Hale □ Editor's

**Note:** Although not confirmed, the iceberg on our cover shows hints of green ice. To learn more about green ice, see our story, "Green Icebergs in the Scotia Sea," on page 7.

## American Polar Society

The American Polar Society was founded Nov. 29, 1934, to band together all persons interested in polar exploration. Membership dues are \$15 a year (\$17, foreign) and entitle members to receive *The Polar Times* twice a year. The American Polar Society is classified as a tax exempt organization under Sec 501(C)3 of the IRS Code. For more information about the American Polar Society, contact Kevin L. Bjella, **APS Secretary**, at 1.802.295.6881 or send email to kevin.bjella@erdc.usace.army.mil.

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## The Polar Times

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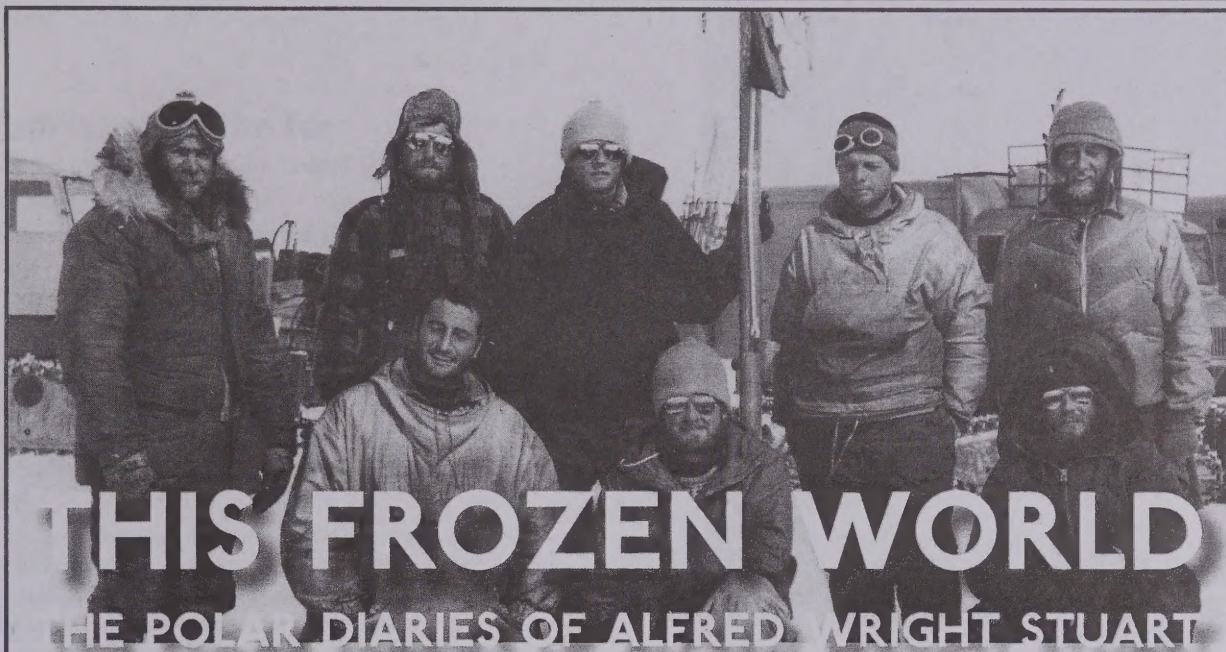
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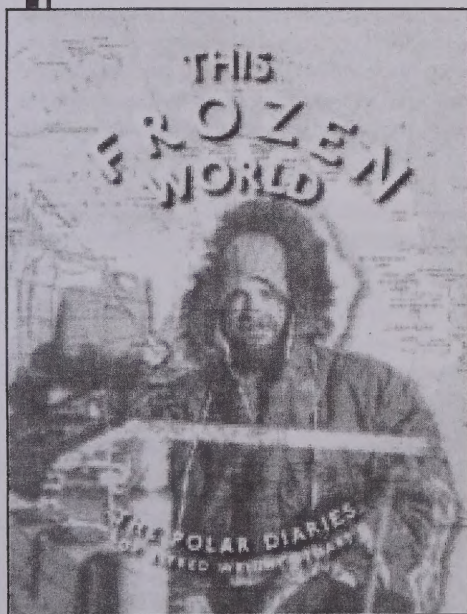




# THIS FROZEN WORLD

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## Footsteps on the Ice

The Antarctic Diaries of Stuart D. Paine,  
Second Byrd Expedition

Edited with an Introduction by M. L. Paine

In 1933 Antarctica was essentially unexplored. Admiral Richard Byrd launched his Second Expedition to chart the southernmost continent, primarily relying on the muscle power of dog teams and their drivers who skied or ran beside the loaded sledges as they traveled. The life-threatening challenges of moving glaciers, invisible crevasses, and horrific storms compounded the difficulties of isolation, darkness, and the unimaginable cold that defined the men's lives.

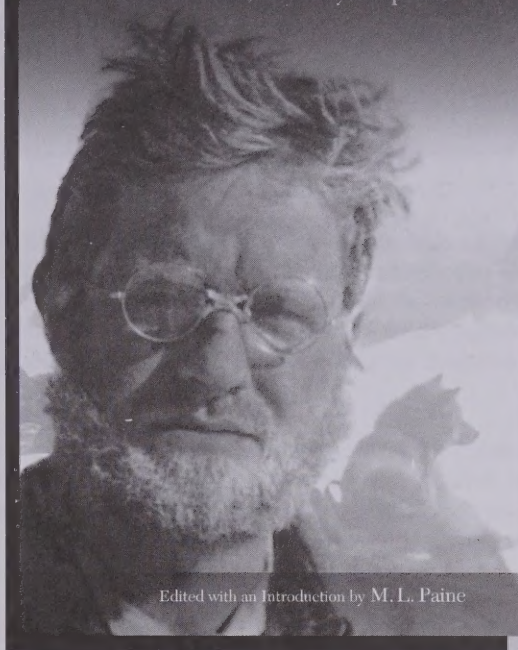
Stuart Paine was a dog driver, radio operator, and navigator on the fifty-six-man expedition, the bold and complex venture that is now famous for Byrd's dramatic rescue from Bolling Advance Weather Base located 115 miles inland. Paine's diaries represent the only published contemporary account written from the inside of the Second Expedition. They reveal a behind-the-scenes look at the contentiousness surrounding the planned winter rescue of Byrd and offer unprecedented insights into the expedition's internal dynamics.

Equally riveting is Paine's breathtaking narrative of the fall and summer field operations as the field parties depended on their own resources in the face of interminable uncertainty and peril. Undertaking the longest and most hazardous sledging journey of the expedition, Paine guided the first American party from the edge of the Ross Sea more than seven hundred miles up the Ross Ice Shelf and the massive Thorne (Scott) Glacier to approach the South Pole. He and two other men skied more than fourteen hundred miles in eighty-eight days to explore and map part of Antarctica for the first time.

*Footsteps on the Ice* reveals the daily struggles, extreme personalities, and the matter-of-fact bravery of early explorers who are now fading into history. Detailing the men's frustrations, annoyances, and questioning of leadership, Paine's entries provide rare insight into how Byrd conducted his expeditions. Paine exposes the stresses of living under the snow in Little America during the four-month-long winter night, trapped in dim, crowded

## Footsteps on the Ice

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huts and black tunnels, while the men uneasily mull over their leader's isolation at Advance Base. The fates of Paine's dogs, which provided some of his most difficult and rewarding experiences, are also described—his relationship with Jack, his lead dog, is an entrancing story in itself.

Featuring previously unpublished photographs and illustrations, *Footsteps on the Ice* documents the period in Antarctic exploration that bridged the "Heroic Era" and the modern age of mechanized travel. Depicting almost incomprehensible mental and physical duress and unhesitating courage, Paine's tale is one of the most compelling stories in polar history, surpassing other accounts with its immediacy and adventure as it captures the majesty and mystery of the untouched Antarctic.

M.L. PAINE, the daughter of Stuart Paine, is an independent researcher who resides in Nevada and Alaska.

384 pages, 151 illustrations, \$34.95

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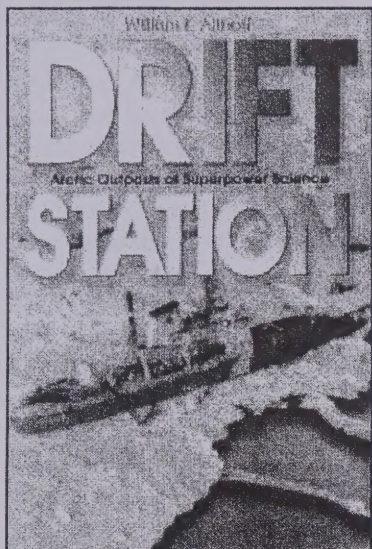
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The Cold War and the missile age saw governments staking further claims, because only a relatively short arc of maritime boreal waste separated North America and Eurasia. The complex interactions of air, ice, and water that drive circumpolar systems also serve as engines of oceanic and atmospheric circulation. As a result, meteorology, oceanography, geophysics, and many other areas of scientific research in the region soon became acutely linked to the economic, political, and particularly the politico-military interests of the Soviet Union, the United States, Canada, and the other Arctic nations.

In response, both superpowers established "drift stations"—that is, isolated camps based on nomadic ice floes—to conduct crucial scientific research. During the Cold War, they were the objects of suspicion, particularly the Soviet stations, which often stood accused as bases for espionage. Today, with the world's climate system and global warming under study, Russian expertise, data, geography, and stewardship are crucial to the world community.

WILLIAM F. ALTHOFF enjoys dual careers as a geologist and historian. His research and writing concern U.S. naval aviation, polar aeronautics, and the history of technology. Althoff has logged numerous visits to the Arctic, working with Canadian and American officials, and, as a guest of the Russian government, conducted research at the renowned Arctic and Antarctic Research Institute in St. Petersburg. He was Ramsey Fellow in Naval Aviation History at the Smithsonian National Air and Space Museum. He is the author of *USS Los Angeles: The Navy's Venerable Airship and Aviation Technology* (Brassey's, Inc., 2003).

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# IGY & IPY: Our Symposium Recalls and Looks Ahead

Organizers of this year's joint American Polar Society/Byrd Polar Research Center symposium, "U.S. Science and Policy: Celebrating IGY and Planning IPY," can justifiably feel proud of their efforts. More than 100 participants enjoyed a rich menu of presentations, book signings, receptions and a closing banquet during the meeting, held 25-27 April at the BPRC, located in Scott Hall on Ohio State University's West Campus.

Great thanks are due to the local organizing committee of **Laura Kissel**, **Lynn Everett** and **Lynn Lay**, who produced an excellent program and executed it flawlessly.

The symposium got off to a strong start on Wednesday afternoon, when **Phil Smith** spoke about "Inventing the International Geophysical Year" at the Wexner Center for the Arts, on OSU's main campus. Phil, a key player in the IGY, gave us an insider's view of its origins and early years.

Afterward, we gathered for a reception in the spacious atrium-lobby of nearby Page Hall, where many introductions were made and acquaintances renewed.

Thursday morning's session began with opening remarks by **W. Berry Lyons**, director of the BPRC, and **John Behrendt**, APS president. John then spoke on "Recollections of a Graduate Student in the IGY—or Fifty Years of Science on the Ice." Our president, one of just a handful of people to work in Antarctica for six successive decades, showed pictures of his time at Ellsworth Station as well as highlights of his 1300-mile oversnow traverse across Berkner Island and what is now called the Ronne Ice Shelf, during which his group en-



These "Old Antarctic Explorers" (OAE), attending the recent symposium in Ohio, are but a small sampling of all the many adventurers, scientists, members of the military and others who have contributed to the world's knowledge of and respect for the Polar regions.

countered crevasses every day. They also hand-developed and washed their seismograph paper recordings and hung them to dry on a line in the cab of their SnoCat.

"Wintering at Byrd Station, Antarctica, 1959-61" was the subject of **Henry Brecher's** talk, in which he gave what he called "a worm's-eye view from a guy who went to Antarctica completely naïve." Henry, who conducted a program of auroral observations, also noted that he saw his first penguin only on his sixth visit to Antarctica.

**Charlie Bentley's** talk, "IGY and IPY: Studying the Ice Sheet Then and Now," revealed

that airborne and satellite radar altimetry has resulted in an improvement of ten orders of magnitude in accuracy in determining ice thickness, compared to the first primitive efforts. Early ice thickness maps, he said, were "95 percent imagination." Charlie concluded by showing us a remarkable satellite image of Antarctica's Lake Vostok. Clearly visible was not only Russia's Vostok Station, but also the thin tracery of the track made by traverse vehicles on their way to the coast at Mirnyy.

After lunch, five polar authors presented their books: **John Behrendt** (*Ninth Circle*), **Paul Berkman** (*Science Into Policy*), **Diane McKnight** (*The Lost Seal*), **Dian Belanger**

(*Deep Freeze*) and **Merlyn Paine** (*Footsteps on the Ice*). **Cliff Bekkedahl**, editor of *The Polar Times*, reviews the latter two of these books in this issue.

Veteran Antarctic tour expedition leader **Susan Adie** spoke next on "Past and Future Trends of Polar Tourism." Notable is the recent creation of an Arctic tour industry group, similar to the International Association

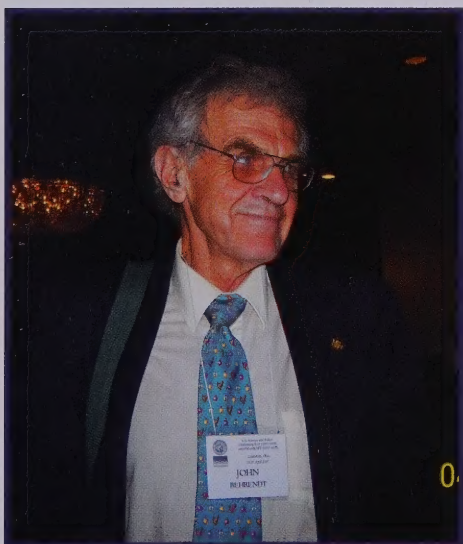
of Antarctica Tour Operators (IAATO). Susan shared many beautiful photographs, including an unusual shot of a leopard seal mother and pup, which are rarely photographed together.

**Dick Bowers** told us about "Gaining a

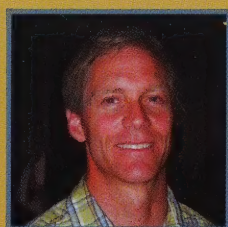
Foothold at McMurdo and Pole Stations" in late 1955 and early 1956. After U.S. Navy Construction Driver Richard T. Williams drowned on 6 January 1956 when his D-8 Caterpillar tractor fell through the sea ice near Ross Island, cargo off-loading was delayed. When the ice cleared out at Hut Point, the men worked 24 hours a day unloading cargo, since the ships had to depart by 15 February. McMurdo got built, and 93 men wintered that first year. A surprising fact revealed by Dick: constructing Pole Station was easier!

**Kim Malville** spoke next on "Traversing the Magnetosphere During the IGY: Aurora,

CONTINUED ON PAGE 4



LONG TALL JOHN: APS President John Behrendt enjoys the symposium banquet.



ALSO IN ATTENDANCE: Kevin Bjella, APS Secretary (left) and Charles Lagerbom, APS Membership Chair. (photos by Irma Hale)



Van Allen Belts and Whistlers.” Of James Van Allen’s 1958 discovery of the Van Allen radiation belts surrounding earth, Kim said, “One cannot overstate the revolutionary nature of this discovery.” He also revealed that other planets besides Earth also have auroras.

On Friday morning, Berry Lyons led a tour of the BPRC. There was also a meeting of the APS Board of Governors in Scott Hall.

**Rai Goerler**, Ohio State University Archivist, spoke briefly to open the morning’s session. He also offered to conduct a tour of the OSU Archives and Book Repository at the end of the afternoon. (Those who attended were rewarded by a special viewing of such artifacts as Admiral Byrd’s pilot’s license and the amazing sight of the OSU Book Depository’s more than one million books, stored in a state-of-the-art facility on 175-foot-long shelves, 36 feet tall and accessed by a forklift.)

“Antarctic Weather Forecasting From IGY to IPY” was the subject of the talk by **David Bromwich**, who discussed the enormous improvements made by satellite observations and advanced modeling techniques. One project, COSMIC (the Constellation Observing System for Meteorology, Ionosphere and Climate), operated jointly by the U.S. and Taiwan, launched six microsatellites in 2006. The constellation will track radio signals from the Global Positioning System as they pass through Earth’s atmosphere. GPS signals undergo changes when they encounter water vapor or other physical components of the atmosphere.

Top prize not only for longest title, but also for most technologically impressive presentation went to **David Carlson**’s “The International in IPY: Energy and Enthusiasm for the International Polar Year 2007-2008.” Originally presented at the 1 March 2007 IPY opening ceremony at the *Palais de la Découverte*, the science museum in Paris, David’s presentation used the latest in PowerPoint and video techniques to zoom us from Columbus to a German research ship off the coast of Antarctica to a classroom on Manhattan’s Upper East Side. At the Paris event, these contacts were all done “live”! Using a handsomely-designed honeycomb graphic, David highlighted seven of the IPY’s 228 international and cross-disciplinary projects—166 of them in science and 52 in education and outreach (described in detail at [www.ipy.org](http://www.ipy.org)). Collectively, the IPY will involve 50,000 researchers and a budget of more than \$1.5 billion.

**Mary Albert** spoke next on “U.S. Federal Agency Involvement in the IPY.” The agencies will primarily investigate large-scale

environmental change, as well as educate people “from K to grey.” Mary pointed us to [us-ipy.gov](http://us-ipy.gov) for more information. She also discussed the Norwegian-U.S. Scientific Traverse of East Antarctica, on which she is the U.S. lead principal investigator. Over the next two years, the traverse will cross the ice from Norway’s Troll Station to the former U.S. Plateau Station, the Pole of Inaccessibility and the South Pole, returning to Troll via the “Recovery Lakes” area.

A quick change of pace was provided by the screening of a Fox Movietone Newsreel, “President Opens International Geophysical Year.” President Eisenhower declared the IGY “the most intensive study ever undertaken of our planet.” The short black-and-white film clips were entertaining and sometimes even informative.



**Abel Shafer (left), long-time contributor to The Polar Times; Irma Hale, this issue’s cover photographer; and Cliff Bekkedahl, The Polar Times managing editor, meet at the recent Ohio symposium.**

**Dian Belanger** was up next, with “Sailors, Scientists and Statesmen: The IGY in Antarctica,” an overview of American operations in Antarctica during the IGY. Dian spiced up her presentation with some excellent photos, including one showing airdrops over the South Pole and another depicting the McMurdo “wedding” of Grace Kelly (portrayed by Jack Tuck) to Prince Rainier of Monaco (Howie Wessbacher) staged by the extroverted but controversial Chaplain John Condit.

**Ted Scambos** and **Clarence Novak** stoked our excitement with “Searching for the Byrd Snow Cruiser,” the ill-fated, oversized over-snow vehicle that traveled fewer than 12 miles in Antarctica, but thrilled Americans in autumn 1939 as it lumbered across back roads from its birthplace outside Chicago to its embarkation wharf in Boston. Abandoned in Antarctica, the Snow Cruiser is thought to have been in one of the icebergs that calved from the Bay of Whales along the front of the Ross Ice Shelf. Scambos

and Novak propose to search the seafloor for the Cruiser and other artifacts using subsurface remote sensing technology. Recent major calvings from the ice shelf in that area mean the seafloor is now uncovered for the first time since the early 1960s. “The greatest failure,” Scambos said, “would be not to try to find it.”

“The First Fifty Years of the Antarctic Treaty System” were outlined by **Paul A. Berkman**. Governing “the Ice” since it came into force on 23 June 1961, the Treaty has been called “a document unique in history which may take its place alongside the Magna Carta,” by no lesser a personage than Larry Gould. Paul also demonstrated his website, the Antarctic Treaty Searchable Database (<http://aspire.nvi.net>), containing the text of all Antarctic Treaty measures from 1959 to the present.

**Berry Lyons** took us to the opposite pole with his talk on “Arctic Observing Networks for the IPY and Beyond.” An integrated Arctic observing network (AON) is to be built from existing and planned observation programs and efforts from many nations and would provide a framework within which existing programs can be linked and supplemented. “We need long-term data sets to understand how the earth works,” Berry emphasized. A total of 31 AON programs are being funded by NSF.

Concluding remarks were made by Berry, John Behrendt and Rai Goerler, who, as an archivist, raised an interesting concern. With so many of the data and records of the IPY being recorded digitally, Rai asks, who will save them?

Friday evening, we gathered at the Holiday Inn on the Lane for a reception and banquet. Our after-dinner speaker was **Chuck Kennicutt**, whose topic was “The Scientific Committee on Antarctic Research (SCAR): A Leader of 21st Century Antarctic Science.” Chuck, the U.S. Delegate to SCAR, along with Terry Wilson, described the changes that SCAR has undergone during the past five years. “In 2002 at our meeting in Shaghai,” he said, “we came in one suit and left in another.” The changes, he added, were designed to bring science back to the center of SCAR activities. U.S. participation in SCAR is significant, with many Americans in leadership positions and about 40 U.S. researchers in various SCAR departments.

Following Chuck’s excellent talk, symposium attendees lingered at the tables enjoying conversation along with their drinks and dessert. Many photographs were taken. Eventually, email addresses were exchanged and farewells said. Then it was upstairs to bed for some, to the bar for others, and—for a few—time to hit the road for home. □



# Pole Station Dedication Planned for January 2008

by Jeff Rubin

With work on the Elevated Station at the South Pole proceeding well, a four-hour station dedication ceremony is now planned during the first two weeks of January 2008.

The on-site ceremony is to include about 40 DVs (distinguished visitors), making it slightly larger in size than the dedication of the Dome held 9 January 1975 (see *The Polar Times*, June 1975 and January 2007).

"There's mixed emotions," says Jerry Marty, construction project manager.

"You look back and you realize you've spent all these years, with all the intensity, the demands and the pressure. We can see the finish line—and that's pretty darn exciting from the accomplishment standpoint—but there's also sadness that it's almost over."

There's still much work to be done to the exterior of the building, however. Fixing the heat-loss problem—replacing champfer panels, installing Tyvek wrap and finally applying the gun-metal grey exterior cladding—will take time. The cladding will eventually cover the entire exterior of the station—top, bottom, and sides—but only the windward side has been completed so far. The goal, Marty says, "is to complete the balance of the station in FY08," which ends 15 February 2008.

Meanwhile, the South Pole Telescope saw first light (see story in this issue, p. 6), and another 13 holes were drilled for the IceCube neutrino observatory. □



NATIONAL SCIENCE FOUNDATION

**This aerial view shows the new elevated station at station closing, 31 January 2007. Starting at left, the 12 square windows to the right of the silver tower light up the galley (dining room); the single tall window is in the medical office; the five widely-spaced square windows are for the computer lab; the next eight, on the higher-roof-lined section, are in the science wing; seven more narrow windows are administrative offices; and the final three square windows are Comms (with antennas on the roof).**

## Deep Freeze I and II Veterans Reunite

by David E. Baker, APS Treasurer

Corpus Christi, Texas, was the site for the reunion of veterans of Deep Freeze I and II in the week following the APS/BPRC Symposium at Ohio State. The reunion, hosted by the daughters of Hospital Corpsman Woody who wintered at McMurdo in 1955-57, drew members of Mobile Construction Battalion (Special) from across the country as well as others who participated in the early years of construction and science in Antarctica.

Five of the original U.S. Antarctic stations—Little America V, McMurdo, Pole, Byrd and Wilkes—were presented. Highlights of the reunion were outstanding presentations by Jerry Marty, Pole Station construction manager, and Elaine Hood, representing Raytheon. Col. Tom Noel also brought two videos highlighting contributions of the

C-130 Hercules to both construction and science.

The most extraordinary event of the three-day reunion was a video conference with the South Pole. Station personnel and reunion attendees were able to ask questions and exchange experiences. The Q & As that were exchanged over the one-hour conference highlighted the tremendous differences between construction in the mid-1950s and the 21st Century. Among those attending were members of the original South Pole construction party led by then-Lt. Dick Bowers, the CEC Officer who directed this extraordinary operation in late 1956.

The next reunion of Deepfreeze I and II members will take place in Madison, Wisconsin in 2009. □



DOMINICK DIRKSEN/NATIONAL SCIENCE FOUNDATION

**When an Adélie penguin decided to take a nap in the middle of the road at McMurdo Station, workers placed signs around him to protect him. (Photo taken 11 January 2007)**



# First Light for South Pole Telescope

*University of Chicago Press Office, 26 February 2007—* Scientists aimed the South Pole Telescope at Jupiter and successfully collected the instrument's initial test observations on 16 February, achieving what astronomers call "first light," the moment when light first passes through all parts of a telescope and it becomes operational.

Soon, far more distant quarry will fall under the SPT's sights as a team from nine institutions tackles one of the biggest mysteries of modern cosmological research: What is dark energy, the force that dominates the universe?

Because the SPT can scan large regions of the sky quickly, scientists expect it to detect thousands—or even tens of thousands—of galaxy clusters within a few years.

"The telescope, camera and optics are all working as designed," said John Carlstrom, the S. Chandrasekhar Distinguished Service Professor in Astronomy & Astrophysics at the University of Chicago, who heads the SPT Team. "First light with the SPT is a major milestone for the project and is a fitting conclusion to a remarkably productive summer season for the South Pole station. We now look forward to fully characterizing the instrument and beginning cosmological observations."

The \$19.2 million SPT is funded primarily by the National Science Foundation, with additional support from the Kavli Foundation of Oxnard, Calif., and the Gordon and Betty Moore Foundation of San Francisco.

The telescope stands 75 feet tall, measures 33 feet across and weighs 280 tons. It was test-built in Kilgore, Texas, then taken apart, shipped by sea to New Zealand and flown to the South Pole.

Since November, the SPT team under the guidance of project manager Steve Padin, Senior Scientist in Astronomy & Astrophysics at the University of Chicago, has worked furiously to reassemble and deploy the telescope.

The SPT is designed to pierce the mystery of dark energy. The solution to that question will determine whether what Einstein considered his greatest blunder was actually one of his greatest achievements.

Astrophysicists know that the universe has been expanding since the Big Bang occurred approximately 14 billion years ago. In the late 1990s, astronomers using exploding stars as cosmic tape measures discovered that the expansion of the universe is accelerating. This



**Iron worker Brian Hardin celebrates the successful installation of the South Pole Telescope dish.**

led them to the idea that dark energy pushes the universe apart, counteracting gravity, the attractive force exerted by all matter in the universe.

The SPT's first key science project will be to study small variations in the CMB (cosmic microwave background) radiation to determine if dark energy began to affect the formation of galaxy clusters by fighting against gravity over the last few billion years. □

## Palmer Crew Cleans Seafloor for Earth Day



Divers at Palmer Station celebrated Earth Day, April 22, by collecting 250 pounds of trash—including plastic debris, ropes and vintage glass Coca-Cola bottles—during 2-1/2 hours of diving, part of an Earth Day clean-up tradition at the station.

"We've often gone over to Old Palmer," Eric Pohlman, Palmer Station Manager, told *The Polar Times*. "There's a lot of garbage over there from the old station, and it's more visible as the snow and ice melts with warmer and warmer seasons here. It's amazing how much you find, even though we try to be a very clean station." Eighty m.p.h. gusts, like those experienced at Palmer recently, blow things around no matter how much you try to tie them down, he added. □



# Green Icebergs in the Scotia Sea

by Richard L. Cameron



A brushtail penguin is barely visible atop the “dog-nose” tip of the right-hand iceberg, seen by a tourist vessel while cruising the Scotia Sea. Green icebergs are formed when organic-rich seawater is trapped by accumulating ice platelets at the very deep bases of Antarctic ice shelves—and are visible only when the bergs turn over to reveal their green undersides.

Cruising the Scotia Sea en route to South Georgia from the Argentine base Orcadas in the South Orkneys, the tourist vessel *Andrea* on 24 January 2007 encountered two bottle-green icebergs with amazingly distinct lines of demarcation between the green and white ice. I was the glaciologist and a lecturer aboard.

As the ship approached the first iceberg (seen at 57°05' S, 38°48' W), an announcement was made over the loudspeaker that we were about to pass an unusual iceberg. Passengers ran for their cameras and then to the decks on the port side to see the berg. The ship slowed a bit as we passed, and the passengers were pleased to have seen such an interesting phenomenon.

This scene was played out once again a little later when we passed the second berg at 56°28.1' S, 37°54.8' W. On the second berg, a brushtail penguin stood as if captain of its own ship.

I have long been fascinated by green icebergs. J.M. Wordie and S. Kemp were the first to describe dark colored bergs (“Observations on certain Antarctic icebergs,” *Geographical Journal*, 81, pp 428-434, 1933). They classified them into two varieties: “the true morainic berg, in which the dark portion is quite black and opaque and consists of mud and stones... while in the other variety the dark part proves on closer approach to be translucent and of a very deep green colour, resembling that of some kinds of glass used in bottle making, and mud and stones appear to be absent.”

This description of the bergs found “off of the mouth of the Weddell Sea” was included

in the U.S. Navy Hydrographic Office’s *Sailing Directions for Antarctica* (1943), which termed the green iceberg “an oddity not readily explained.”

In March 1976, Ken Moulton, the associate manager of polar operations in the NSF’s Division of Polar Programs, photographed a bottle-green iceberg near Livingston Island in the South Shetlands. We collaborated on a short article (K.N. Moulton, and R.L. Cameron, “Bottle-green iceberg near the South Shetland Islands,” *Antarctic Journal of the U.S.* 11, pp 94-95, 1976), but put forth no definitive ex-

planation of this unusual berg.

Since then, considerable research has been undertaken by a number of scientists. The consensus is that this green ice is formed by the freezing of organic-rich seawater to the base of Antarctic ice shelves (see Kipfstuhl et al, “The origin of green icebergs in Antarctica,” *Journal of Geophysical Research*, 97, pp 20.319-20.324, 1992, and Warren et al, “Green icebergs formed by freezing of organic-rich seawater to the base of Antarctic ice shelves,” *Journal Of Geophysical Research*, 98, Issue C4, pp 6921-6928, 1993). It is reasoned that organic matter is trapped by accumulating ice platelets.

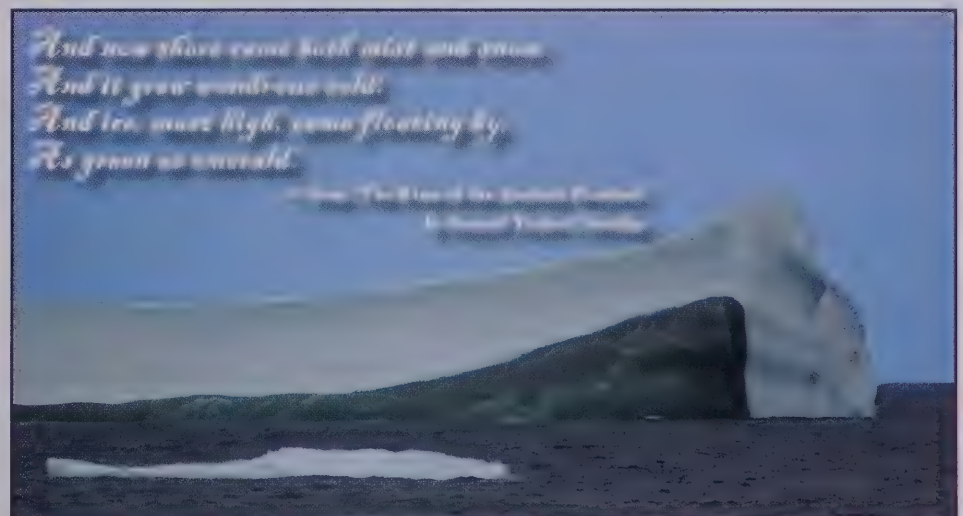
C. F. Bohren (“Colors of snow, frozen waterfalls, and icebergs,” *Journal of the Optical Society of America*, 73, pp 1646-1652, 1983) discusses a variety of blue and blue-green icebergs but states that he had never seen a green

iceberg. He does note that others have seen them and refers to the “Rime of the Ancient Mariner” by Samuel Taylor Coleridge (see photo below).

As the “Ancient Mariner” was written in 1789, it is most likely that the reference to huge bergs

and those of dark green color came from the voyage of Captain James Cook near the Weddell Sea and South Georgia. Indeed, this area has green icebergs in addition to many huge bergs. □

*The origins of green icebergs—which have fascinated mariners since the time of Coleridge’s “Rime of the Ancient Mariner”—eluded scientists for many decades, but there is now a consensus about their formation.*





# How Antarctic Discoveries Reunited Gondwana: A Personal Account

By George A. Doumani

With the advent of the International Polar Year (IPY), Antarctic discoveries during and after the International Geophysical Year (IGY) almost fifty years ago become essential to planning and executing projects relevant to those discoveries. This is an historical, personal account of the discoveries that proved the theory of continental drift and reunited Gondwana.

## Historical Background

In the mid 1950s, while working on my thesis at the University of California, Berkeley, I researched a paper on the drifting continents. I traced the origin of the theory dating back to the 19th century, when the Austrian geologist Edward Suess provided comparative geological evidence and suggested that the southern hemisphere continents, including India, were once in one single continent he called Gondwanaland. Early in the 20th century, Alfred Wegener of South Africa published his book *The Origin of Continents and Oceans*, proposing that the continents were once a single mass called Pangaea. Supporting Wegener, Alexander Du Toit visited South American countries and published *A Geological Comparison of South America with South Africa* (1927) and *Our Wandering Continents: An Hypothesis of Continental Drifting* (1937).

My positive impression of that literature was evident in my paper, but my professor

warned me that I should not jump to conclusions. There were, he said, too many questions among American scientists, with some scathing criticism, especially of Wegener's lack of a mechanism by which the continents could move. There was also a lack of convincing evidence in correlating among the continents geological formations and paleontological records. Until then, Antarctica held the missing link in reassembling the continents to recreate Gondwanaland. After finishing my graduate work at the beginning of the IGY, I was still intrigued by the theory of continental drift and saw an opportunity to join the American team exploring Antarctica.

## Early Discoveries

My exploration started at the end of the IGY, relieving the scientists at Byrd Station and finishing their West Antarctic traverse. The IGY traverses focused mainly on geophysical and glaciological data collection; doing geology was mostly cursory—visiting mountains *en route* and scanning outcrops as time permitted. On that traverse, William E. Long, then a graduate student at Ohio State University, visited the Buckeye Range in the Horlick Mountains and discovered glacial deposits, coal beds, *Glossopteris* flora and Lower Devonian fauna. He then delivered a paper at a conference in Argentina, where he referred to the glacial deposits as a formation of conglomerate. Southern Hemisphere geologists attending the conference immediately considered the conglomerate a tillite.

From Berkeley I moved to Ohio, where I joined the newly established Institute of Polar Studies at Ohio State. I participated in the next expedition to the Horlick Mountains as geologist and paleon-



George Doumani, circa the end of the IGY, while traversing West Antarctica

tologist with Long's team. During the austral summer of 1960-61, we returned to the Buckeye Range, built a Jamesway hut for shelter, called it Camp Ohio and started exploring the accessible outcrops. We studied the geology in detail and discovered and collected numerous species of fossil flora and fauna, as well as coal beds, in a fascinating stratigraphic succession looking identical to similar deposits in Africa and South America.

The stratigraphic succession dated back to the Lower Devonian up to the Permian. It was replete with Lower Devonian fossil fauna at the bottom of the strata, followed by a thick tillite, the first such Paleozoic formation matching the Permocarboneferous tillites of other southern-hemisphere continents. The stratigraphy up the column to the Permian also matched similar formations in other continents. The fossil flora was very impressive, especially on Terrace Ridge: wide ledges paved with 20-foot petrified tree trunks, 12-inch *Glossopteris* leaves and tree trunks in upright position. The layers of sandstone and shales were simply packed with remains of animal life that had once thrived on the Lower Devonian sea floor. They included numerous species of lamp shells, cockle shells, razor clams, gastropods and trilobites.

## Confirming The Evidence

The next austral summer, Bill Long and I returned to Camp Ohio with a new team. We expanded our work into the neighboring mountains and collected more fossils. Long



Fossil leaf more than 12 inches long and 6 inches wide, associated with the *Glossopteris* flora.



brought with him a drill and some explosives to obtain fresh samples from the coal bed. He blasted the facade of the 13-foot-thick coal bed, and the team systematically collected samples from top to bottom. I collected as many fossils as weather conditions permitted.

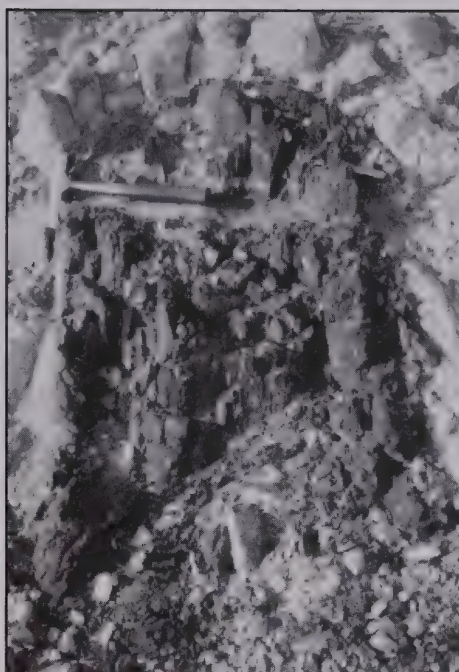
At the Institute of Polar Studies, it became obvious that our collection was of global and historical significance and should be studied more thoroughly. I went to the California Institute of Technology in Pasadena, where I spent a few weeks working with Arthur Boucot on the brachiopods. He contacted several specialists to whom we distributed the other species in which each scientist specialized. Our work resulted in numerous publications establishing correlation among Southern Hemisphere continents, confirming their origin in Gondwana and proving the theory of continental drift. A list of recommended reading can be found in my book *The Frigid Mistress: Life and Exploration in Antarctica* (1999).

The continent beckoned once more, and I decided to follow Antarctica's rock outcrops literally to the ends of the earth to see if we had missed anything. In the austral summer of 1962-63, I led a team from Ohio State to the area between Mount Weaver and Mount Howe, the farthest mountain toward the South Pole. We established a camp on the polar plateau and called it *Saxum Ultimum* ("the farthest rock"). More discoveries were made, including fossil *Glossopteris* wood with a tree trunk upright in situ on Mount Weaver and a coal bed 25 feet thick. We also found more *Glossopteris* and coal on Mount Howe within three degrees latitude from the South Pole.

### Camp Ohio Revisited

After the last expedition, I left the Institute of Polar Studies, joined the Library of Congress, established the Cold Regions Bibliography Section and started the *Antarctic Bibliography* for the National Science Foundation and continued the *Bibliography on Snow, Ice, and Permafrost* for the Army Corps of Engineers' Cold Regions Research and Engineering Laboratory (CRREL).

Barely settled into a "normal" life, I was asked to join Arthur Boucot and return to Camp Ohio to collect more fossils. Realizing the historical importance of the initial collection, Boucot wanted to return to the Horlick Mountains and collect samples in bulk and use his crusher at Cal Tech to obtain more precise details. The previous specimens were extracted individually under severe weather conditions, and numerous details were needed from the hosting rocks.



**Fossil upright tree stump, more than two feet in diameter, discovered on Mount Weaver, close to three degrees latitude from the South Pole.**

In pursuing the farthest rocks in my last expedition, we had used Army helicopters to save time and facilitate access to outcrops. So, I asked the National Science Foundation to provide helicopters for the proposed trip, and Boucot and I returned to the old Camp Ohio. Boucot came armed with a sledge hammer, a crowbar and large burlap bags. We collected bulk samples from the old location on Discovery Ridge and used the helicopter to land on Treves Butte, which was inaccessible to us on the earlier trips. On Treves Butte we literally stepped on a Lower Devonian beach crowded with all kinds of fossils. We collected 2,500 pounds of bulk rocks and were back in the U.S. in thirteen days.

### Conclusion

The plethora of fossils we collected included a variety of articulate and inarticulate brachiopods and numerous other bivalves (e.g., *Tanerhychia doumanii*, *Nuculites africanus*, two conchostracan species—*Laeia gondwanella* and *Cysicus (Lioestheria) doumanii*, to name a few), as well as the trilobite *Burmeisteria antarcticus* and a plate of an arctolepid fish, all

matching similar fauna in the Southern Hemisphere continents.

The fresh-water laeiid conchostracans and coal measures in the Ohio Range, associated with the *Glossopteris* flora with *in situ* logs in upright position, in Permian strata with very sharp vertical restrictions, refute arguments of intercontinental transport across the oceans. Eggs of these freshwater animals, hatched in freshwater puddles, are readily perishable in ocean water. They also match perfectly similar species in South America, South Africa and Australia in identical stratigraphic successions. We also searched unsuccessfully for the freshwater *Mesosaurus*, found in Brazil and South Africa, due to shortage of field time, severe Antarctic weather conditions and inaccessibility of outcrops. Although we already had collected conclusive evidence, finding *Mesosaurus* in Antarctica would have added significantly to the importance of the freshwater fauna.

Add to that, coal beds up to 25 feet thick, growing in a mild climate, and the other species of shallow and coastal waters, and the question arises: How could such an environment exist under an ice sheet three miles thick? One does not have to be a geologist or paleontologist to conclude that either the continent was not there when the pole was there, or the pole was not there when the continent was green.

Continental movement became a global fact. The evidence was compelling and irrefutable that the Southern Hemisphere continents were once united. In the advent of the International Polar Year, Antarctic discoveries almost fifty years ago should be remembered as having proved, beyond the shadow of a doubt, the theory of continental drift and reunited Gondwana.



**A Jamesway hut at Camp Ohio in the Horlick Mountains, with Mount Schopf in the background.**



# Two-Year International Study of Polar Changes Set to Begin

**New York Times, 26 February 2007, by Andrew C. Revkin**—Scientists from more than 60 countries are preparing to fan out around the North and South poles in an ambitious two-year effort to understand the vital, shifting dynamics of ice, oceans and life at the ends of the earth.

With a budget of about \$350 million spread over more than 120 projects, researchers will camp on drifting Arctic Ocean sea ice and trek to largely uncharted Antarctic mountains.

They will use gliding underwater robots, giant icebreaking ships, satellites and other technologies to explore polar climate, biology, geology and ocean chemistry, and they will undertake physics and astronomy studies that can be done only at the poles.

A central goal of the effort—called the International Polar Year, despite its two-year timetable—is to clarify the role of greenhouse gases and global warming in the rapid changes that are already occurring at both poles.

In the Arctic, sea ice in summer has been in an accelerating retreat. In parts of Antarctica that are warming, coastal ice shelves and inland ice sheets have been disintegrating and surging seaward in ways that could hint at a faster rise in global sea levels in coming decades.

But at both poles, scientists say, questions still outnumber answers. The project will formally begin Thursday. Opening ceremonies will be held today in Washington, London and Strasbourg, France.

This is just the fourth such integrated Arctic and Antarctic science effort since 1881. The last such project, which included broader studies of the oceans and earth, ended in 1958.

John H. Marburger III, the science adviser to President Bush, said the United States had a vital interest in studies at both poles,

“The North Pole is in our backyard,” he said in an e-mail message. “The U.S. has huge geopolitical interests in the Arctic region, and we need to understand the changes that are taking place there. Many other countries have direct economic interests in the Arctic, and all are served by joining forces in I.P.Y. research. Additionally the rapidly diminishing ice in the Arctic is creating new opportunities for transport and marine resource development.

“The South Pole is on a major continent, still poorly understood,” Dr. Marburger added.

“With the exception of the Arctic Ocean, all the oceans of the Earth communicate in the Antarctic region, which makes it a significant factor in processes of global change, particularly as influenced by ocean currents. It offers remarkable opportunities for astronomy and is already the site of a sophisticated neutrino detector utilizing the deep and stable ice deposits near the pole.

“Antarctic marine organisms are an integral part of the increasingly vulnerable marine wildlife environment, and play a significant role in the world food chain.”

Other studies will examine the impact of pollution, retreating sea ice, thawing tundra and other fast-changing conditions on native communities ringing the Arctic Ocean.

Some projects are utilitarian, like fresh surveys of ocean-bottom terrain and studies sifting for hints of oil and gas or other natural resources.

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*“The trillion-dollar question from the point of view of sea-level rise: How much, how quickly?”*

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But the most pressing questions being pursued relate to warming caused by the atmospheric buildup of heat-trapping gases like carbon dioxide. Experts involved with the polar year say the earth’s coldest places are likely to be especially affected.

“The poles are going to lead the way in climate change,” said Ted Scambos, a researcher at the National Snow and Ice Data Center in Boulder, Colo. “To know what we’re in for in the next 10 years, in sea level or in climate, we need to look at the poles now. They are the amplifiers of the small warming that greenhouse gases cause.”

Particularly urgent, many experts said, is the need to improve understanding of the complicated forces that might cause warming ice sheets in Greenland and parts of Antarctica to flow more quickly into the sea.

Greenland’s vast ice cap is twice the size of California, and it holds as much water as the Gulf of Mexico. If it all melted, sea levels from Boston to Bangladesh would rise more than 20 feet, experts say.

The latest report on sea level trends by the United Nations Intergovernmental Panel on Climate Change said such melting could take a millennium or more. But because of a lack of long-term measurements and poor

understanding of the physics of ice, that analysis largely excluded hints of an accelerating flow of ice and meltwater from Greenland into the seas.

“The change of phase from snow and ice to water is the biggest tipping point in the earth’s system, and so, although the International Polar Year covers a huge range of science, for me the big issue is climate change and the impact that it’s having here,” said Chris Rapley, the director of the British Antarctic Survey, in a message from Antarctica.

“Over the next two years, I’m looking forward to major progress on key issues,” he said. “The trillion-dollar question from the point of view of sea-level rise: How much, how quickly?”

The climatic equations are complicated. Over the two years—four researchers want to study both regions through complete summer and winter cycles—teams will examine the effects of shifting solar activity, greenhouse gases and the synthetic chemicals that harm the ozone layer which have an outsize impact at the poles.

Other scientists will intensively study the warming of the permafrost and tundra across vast stretches of northern continents for signs that thawing ground, bogs and lakes are giving up emissions of methane and carbon dioxide.

Marine scientists will plumb the Arctic Ocean and productive waters around Antarctica to see how shifts in sea ice and ocean currents affect species from clouds of shrimp-like krill to whales, penguins and polar bears.

Most of these subjects have already been a focus of research. But several veteran earth and polar scientists said periodic intensive efforts like the polar years helped them to generate fresh ideas, collect data that individual countries lack the resources to pursue, and refresh the public’s appreciation for the splendor of the world’s least-habitable places.

Walter Munk, 89, an emeritus professor of geophysics at the University of California, San Diego, who helped run the 1957-58 effort (called the International Geophysical Year) said that what was needed most was long-term studies of earth’s poles and oceans.

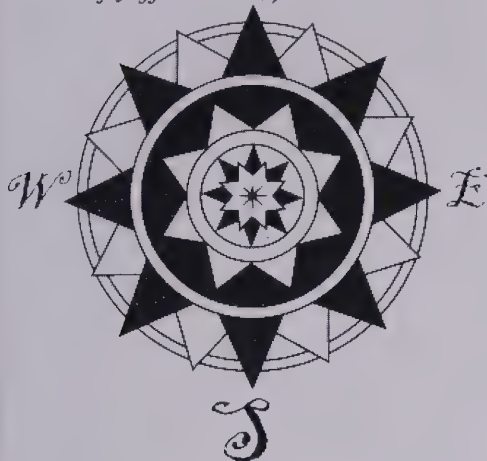
But he added that the polar year would provide a necessary short-term focus. “Our society is poorly conditioned for sustained efforts,” he said in an e-mail message. “I rather think that without the occasional burst there would have been even less of a sustained effort.” □



# James Eights Gets His Due

## Due South

by Jeff Rubi *N*, Antarctic Editor



I've long been interested in James Eights, a little-known 19th century naturalist-explorer from Albany, N.Y. who was the first American scientist to visit the Antarctic.

From 1829 to 1831, Eights accompanied a sealing and exploring expedition led by Capt. Benjamin Pendleton to the South Shetland Islands in two brigs, *Seraph* and *Annawan*, in company with the schooner *Penguin*.

During the expedition, Eights found the first Antarctic fossil (a "fragment of carbonized wood" two and a half feet long); discovered the ten-legged sea spiders called *Decolopoda* and two other new marine invertebrate species, elegantly illustrating all three of them; made the first scientific record of a flowering plant in Antarctica (known today as *Deschampsia antarctica*); and was the first to use the term "tabular" for flat-topped icebergs, while also accurately describing their origin from ice shelves.

Eights collected rocks, lichens and marine animals—and between 1833 and 1852 published five papers in professional scientific style about his discoveries.

Sadly, these reports were long neglected.

In one of his papers, Eights discussed the transportation of rocks by icebergs—anticipating Charles Darwin by six years, though Eights' discovery was uncredited because it was published only in an obscure journal.

Despite his many remarkable accomplishments, wide recognition was long in coming to Eights.

"It is extraordinary," says Beau Riffenburgh's authoritative new *Encyclopedia of the*

*Antarctic*, "that his work was almost unknown for nearly 100 years."

In the mid-20th century, Antarctica's Eights Coast, 90°-100°W longitude, was named for him, and the U.S. commemorated its first Antarctic scientist with an atmospheric research station that operated at the base of the Antarctic Peninsula from January 1963 to January 1965.

But aside from an occasional paper or book chapter, not very much had been written about Eights until 2005. In that year, a superlative new biography was published, and I'm grateful to my brother- and sister-in-law, Richard and Kristin, for bringing it to my attention.

*James Eights, 1798-1882: Antarctic Explorer, Albany Naturalist; His Life, His Times, His Work* (published as the New York State Museum Bulletin number 505) is an impressive work of scholarship.

Written by Daniel L. McKinley, an associate professor emeritus of biological sciences at the State University of New York at Albany, the book is the product of more than three decades' work.

"I began studying about Eights about 35 years ago," McKinley, now 82, told me recently. "Someone mentioned James Eights to me, and I realized that I'd never heard of him—and I thought I knew a good bit about polar exploration.

"So I began digging," he said.

Did he ever!—and what a trove he found.

If there's an aspect of James Eights' life not covered by this book, it's not for lack of effort on McKinley's part.

To give an idea of the depth and breadth of this newest and best work on an unsung American Antarctic pioneer, here are a few statistics: 456 pages, 31 chapters, 27 figures, and an amazing 785 sources cited in the bibliography.

Oh, and a \$49.95 price tag.

Possessing a keen eye for observation and exceptional artistic skills, Eights was also a vivid writer, as can be seen in a passage from his 1846 article in the *American Quarterly Journal of Agriculture and Science* titled "On the Icebergs of the Ant-Arctic Sea":

"It is almost impossible to conceive anything more delicately beautiful than the effect produced by these icebergs, when the sky is free from clouds, and the ocean is at rest; it is then there can be traced, among the numerous angles and indentations by which they are impressed, all those mingling gradations of color, from the faintest tinge of emerald green to that of the most intense shades of blue."

Aside from Eights' scientific papers, however, McKinley did not have much primary material to work with, for Eights left very little in the way of personal records. As an early writer, J.M. Clarke, put it: "I must say here that the records of the whole long life of James Eights are so particularly fragmented that a diligent search has resulted in a mere matter of shreds and patches."

McKinley, though, has found much more than shreds and patches.

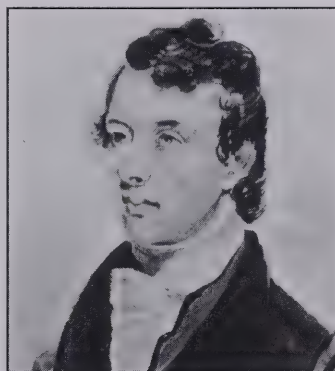
Not only is Eights' Antarctic work covered thoroughly in eight richly-footnoted chapters, but his early life and later accomplishments are also outlined as fully as possible.

In two additional chapters of interest to Antarcticans, McKinley writes about Eights' disappointing involvement in the planning for Lieutenant Charles Wilkes' U.S. Exploring Expedition of 1838-1842. Despite incurring heavy expenses and spending a great deal of time in preparation for the voyage, Eights was left behind when it sailed. He spent years seeking compensation, apparently without success.

Overall, the only criticism I can offer about this book is that it unfortunately lacks an index—a useful aid in a work of such exhaustive detail.

What interested McKinley most about his subject? "I was taken by the fact that Eights didn't get credit for some of the things that he did," the author told me. "I think mainly he was always in need of money, just scrounging up a little bit of cash to pay the bills. That's what he spent most of [his] life doing."

Eights' name died with him, but for students of 19th century Antarctic history—and now, thanks to Daniel McKinley's wonderful book, for a wider reading public, too—he will remain prominent in chronicles of early Antarctic science. □



James Eights, subject of a new biography by Daniel L. McKinley, shown in a watercolor dated about 1825.

FROM "JAMES EIGHTS, 1798-1882: ANTARCTIC EXPLORER, ALBANY NATURALIST"



# Scott's Final Letter

British Antarctic explorer Captain Robert F. Scott's final letter to his family, reproduced below, has been donated to Cambridge University by Lady Phillippa Scott, the widow of the explorer's naturalist son, the late Sir Peter Scott. It has been placed on public display for the first time at Cambridge's Scott Polar Research Institute. Written on scraps of Scott's journal over a period of days, it was found in his tent when the team's bodies were recovered in 1913. SPRI now houses more than 300 letters written by Scott.

## To my widow

Dearest Darling—we are in a very tight corner and I have doubts of pulling through—In our short lunch hours I take advantage of a very small measure of warmth to write letters preparatory to a possible end—the first is naturally to you on whom my thought mostly dwell waking or sleeping—if anything happens to me I shall like you to know how much you have meant to me and that pleasant recollections are with me as I depart.

I should like you to take what comfort you can from these facts also—I shall not have suffered any pain but leave the world fresh from harness and full of good health and vigour—this is dictated already, when provisions come to an end we simply stop where we are within easy distance of another depot. Therefore you must not imagine a great tragedy—we are very anxious of course and have been for weeks but on splendid physical condition and our appetites compensate for all discomfort. The cold is biting and sometimes angering but here again the hot food which drives it forth is so wonderfully enjoyable that we would scarcely be without it.

We have gone down hill a good deal since I wrote the above. Poor Titus Oates has gone—he was in a bad state—the rest of us keep going and imagine we have a chance to get through but the cold weather doesn't let up at all—we are now only 20 miles from a depot but we have very little food or fuel.

Well dear heart I want you to take the whole thing very sensibly as I am sure you will—the boy will be your comfort I had looked forward to helping you to bring him up but it is a satisfaction to feel that he is safe with

you. I think both he and you ought to be specially looked after by the country for which after all we have given our lives with something of spirit which makes for example—I am writing letters on this point in the end of this book after this. Will you send them to their various destinations?

I must write a little letter for the boy if time can be found to be read when he grows up—dearest that you know cherish no sentimental rubbish about re marriage—when the right man comes to help you in life you ought to be your happy self again—I hope I shall be a good memory certainly the end is nothing for you to be ashamed of and I like to think that the boy will have a good start in parentage of which he may be proud.

Dear it is not easy to write because of the cold—70 degrees below zero and nothing but the shelter of our tent—you know I have loved you, you know my thoughts must have constantly dwelt on you and oh dear me you must know that quite the worst aspect of this situation is the thought that I shall not see you again—The inevitable must be faced—you urged me to be leader of this party and I know you felt it would be dangerous—I've taken my place throughout, haven't I?

God bless you my own darling I shall try and write more later—I go on across the back pages.



Since writing the above we have got to within 11 miles of our depot with one hot meal and two days cold food and we should have got through but have been held for four days by a frightful storm—I think the best chance has gone we have decided not to kill ourselves but to fight it to the last for that

depot but in the fighting there is a painless end so don't worry.

I have written letters on odd pages of this book—will you manage to get them sent? You see I am anxious for you and the boy's future—make the boy interested in natural history if you can, it is better than games—they encourage it at some schools—I know you will keep him out in the open air—try and make him believe in a God, it is comforting.

Oh my dear my dear what dreams I have had of his future and yet oh my girl I know you will face it stoically—your portrait and the boy's will be found in my breast and the one in the little red Morocco case given by Lady Baxter—There is a piece of the Union flag I put up at the South Pole in my private kit bag together with Amundsen's black flag and other trifles—give a small piece of the Union flag to the King and a small piece to Queen Alexandra and keep the rest a poor trophy for you!—What lots and lots I could tell you of this journey.

How much better it has been than lounging in comfort at home—what tales you would have for the boy but oh what a price to pay—to forfeit the sight of your dear dear face—Dear you will be good to the old mother.

I write her a little line in this book. Also keep in with Ettie and the others—oh but you'll put on a strong face for the world—only don't be too proud to accept help for the boys sake—he ought to have a fine career and do something in the world.

I haven't time to write to Sir Clements—tell him I thought much of him and never regretted him putting me in command of the Discovery.



EDITOR'S NOTE: In response to an inquiry from Sheldon Bart, a member of the APS Board of Governors, at the recent Symposium in Columbus, Henry Brecher of the Byrd Polar Research Center at Ohio State University went through the exercise of calculating where Scott's tent is likely to be now and how long it would take for it to go out to sea based on known ice motion in the area. Brecher came up with the result that the tent would take 326 years to reach the ice front and that the April 2007 position of the tent is 79° 12' S, 171° 03' E, computed from 95 years of movement (67 km along the flow line) from the March 1912 position. □



# Twelve Tourist Sites Get New Site Guidelines

by Jeff Rubin

With the number of passengers landed in Antarctica surging to 25,191 in 2005-06, strict new guidelines for Antarctic tourism adopted by the 29th Antarctic Treaty Consultative Meeting (ATCM) in Edinburgh put in place site-specific guidelines for 12 of the most-visited sites in the Antarctic Peninsula region.

The resolution reviewed the four site-specific guidelines approved at the 28th ATCM in Stockholm for Penguin Island, Aitcho Islands, Cuverville Island and Jougla Point, Wiencke Island (see *The Polar Times*, Jan. 2006) and added eight more sites: Goudier Island (Port Lockroy), Hannah Point, Neko Harbour, Paulet Island, Petermann Island, Pleneau Island, Turret Point and Yankee Harbour.

Designed to limit the cumulative impact of visitors, the new guidelines prohibit landings between 2200 hrs and 0400hrs (local time) in order to establish a resting period for the wildlife, although those engaged in organized overnight stays (camping) are allowed. No more than 100 visitors are allowed ashore simultaneously (one ship at a time), and there must be one guide per 20 visitors; some sites have lower limits on the number of simultaneous visitors.

All but one (Neko Harbor) of the sites now have "closed areas" where visiting is prohibited. Most sites have two or three closed areas; Penguin Island has four.

Free roaming by passengers (supervised by expedition staff) is no longer allowed at

Penguin or Paulet islands.

Only Cuverville Island, Jougla Point, Goudier Island (Port Lockroy), Neko Harbour, Petermann Island and Yankee Harbour allow visits by ships carrying more than 200 passengers, permitting limited visits by ships carrying fewer than 500 passengers.

Limits on the maximum number of ships per day (midnight to midnight), range from one (at Hannah Point) to three.

Given the limited space at Hannah Point, visits are strongly discouraged from the start of the breeding season in October until after early penguin incubation phase in mid-January.

A double-sided sheet (see photo) for each site outlines the guidelines and includes photographs and maps.

**Hannah Point**

**ANTARCTIC TREATY**

**Description**

**TOPOGRAPHY** Hannah Point (the Point) is a narrow peninsula undulating upward to knife-edged ridges and vertical cliff edges 30-50 metres above sea level. There is loose scree on higher slopes and ridges, evidence of rock falls, and a jagged mineral vein. Ash-covered slopes link the Point to the flat open beach area of Walker Bay.

**FAUNA** Confirmed breeders: Chinstrap (*Pygoscelis antarctica*), gentoo (*Pygoscelis papua*), and maraon penguin (*Eudyptes chrysotophus*), blue-eyed shag (*Phalacrocorax atriceps*), shaggy shag (*Phalacrocorax atriceps*), black-bellied storm-petrel (*Fregetta tropica*), pinkish petrel (*Lophopus dohrnii*), black-bellied storm-petrel (*Fregetta tropica*), pinkish petrel (*Lophopus dohrnii*), and southern giant petrel (*Mucronastur gaussonii*). Regularly haul out: southern elephant seals (*Mirounga leonina*), Weddell seals (*Leptonychotes weddellii*), and Antarctic fur seals (*Arctophoca gazelle*).

**FLORA** Vegetation covers the upper slopes of the Point. *Dicksonia antarctica*, *Criobanhus guineensis*, *Xanthorrhoea* spp. and other epiphytic lichens are present. The green alga *Prorocentrum* is widespread. Large moss patches cover Walker Bay.

**OTHER** Some fossil and rock specimens may be observed towards the eastern end of the flat open beach area of Walker Bay.

**Visitor Impact**

**KNOWN IMPACTS** The erosion of a footpath between the Point and Walker Bay.

**POTENTIAL IMPACTS** Erosion and disturbance of vegetation and wildlife, especially as visitor space is limited on the Point.

**Landing Requirements**

**SHIPS\*** Ships carrying 200 or fewer passengers. One ship at a time. The Point. Given the limited space at this site, visits are strongly discouraged from the start of the breeding season (October) until after early penguin incubation phase (mid-January). After this, maximum 1 ship per day (midnight to midnight). Visits to last no longer than 6 hours. Walker Bay: a maximum of 2 ships per day (midnight to midnight).

**VISITORS** No more than 100 visitors at any time, exclusive of expedition guides and leaders, with not more than 50 on the Point. 1 guide per 20 visitors. No visitors on the Point between 22 00hrs and 04 00hrs (local time).

**Visitor Area**

**LANDING AREA** Primary: The small cobble beach on the northern coast of Hannah Point. Secondary: If conditions permit, an alternative landing area is the flat open area of Walker Bay, to the north of the Point.

**CLOSED AREAS** Closed Area A: Cult area with nesting southern giant petrels. Closed Area B: Rocky outcrops with nesting southern giant petrels including a 50 metre buffer zone.

**GUIDED WALKING AREAS** Because of restricted visitor space, all walks around the Point should be strictly controlled in guided groups of no more than 15-20 visitors, which are well spaced and when taking the same path. Visitors walking between the Point and Walker Bay should proceed in single file in small groups, avoiding wildlife and other sensitive features.

**FREE-PRAMING AREAS** Visitors may roam freely but under supervision, on the beach in Walker Bay, avoiding Closed Area B.

\* A vessel is defined as a vessel which carries more than 20 passengers.

For more information, visit the homepage of the Antarctic Treaty Secretariat at <[www.ats.aq](http://www.ats.aq)> and click on the Documents tab. □



## Announcing your new American Polar Society Web Site [www.ampolarsociety.org](http://www.ampolarsociety.org)

Learn about the American Polar Society: how it came to be organized and the explorers, scientists, technicians and adventurers who, along with a growing number of "armchair enthusiasts," make up its membership.

See fantastic photographs, maps and drawings and peruse book and movie reviews about the Polar regions. In addition, learn or share news about upcoming Polar-related events and learn how to become a member of the Society yourself!

### COMING SOON: Member Forum



# Antarctic Notes

## Peninsula Glaciers Flowing Faster

**British Antarctic Survey press release, 5 June 2007**—Hundreds of glaciers on the Antarctic Peninsula are flowing faster, further adding to sea level rise, according to a paper in this week's *Journal of Geophysical Research*. Climate warming, already causing increased summer snow melt and ice shelf retreat on the Peninsula, is the most likely cause. Using satellite radar images, scientists tracked the flow rate of more than 300 previously-unstudied glaciers. They found a 12% increase in glacier speed from 1993 to 2003. These observations indicate that the cause is melting of the lower glaciers, which flow directly into the sea.

## Thompson Awarded National Medal of Science

**Ohio State University press release, 29 May 2007**—OSU glaciologist Lonnie Thompson will receive the National Medal of Science for his work providing explicit evidence of global climate change.

## Vast Regions of West Antarctica Melted Recently

**NASA press release, 15 May 2007**—NASA and university scientists have found clear evidence that extensive areas of snow melted in west Antarctica in January 2005 in response to warm temperatures, the most significant melt observed using satellites during the past three decades. The affected regions encompassed a combined area as big as California, and the melting occurred in multiple distinct regions where melt had been considered unlikely: up to 900km inland, farther than 85°S and at elevations above 2,000m. No further melting had been detected through March 2007.

## Climate Change Affects Southern Ocean CO2 Sink

**British Antarctic Survey press release, 15 May 2007**—Recent climate change has weakened one of the Earth's natural carbon "sinks." A four-year study in this week's *Science* reveals that an increase in winds over the Southern Ocean, caused by greenhouse gases and ozone depletion, has led to a release of stored CO2 into the atmosphere and is preventing further absorption of CO2.

## Irizar's Recovery Could Take More Than Two Years

**Mercopress.com, 9 May 2007**—Damages suffered by the 119-m Argentine icebreaker *Almirante Irizar* when fire broke out on board are far more serious than originally announced, and full repairs could take more than two years. Although Captain Guillermo Tarapow optimistically declared that "85% of the vessel had been saved" when the vessel was towed to port, not only the generator room—where the fire started on 10 April—and the engine room were razed, but it now appears the labs, refrigerated samples, records and equipment were a total loss. Brazil and Britain have offered their Antarctic vessels to help Argentina with its operations in the coming summer.

## Astronaut to Ride Hydrogen Hummer to Pole

**New Zealand Press Association, 2 May 2007**—A plan by former astronaut Buzz Aldrin and Apple Macintosh billionaire Steve Wozniak to drive a monster 4WD round-trip to the South Pole next Christmas is drawing flak over environmental concerns. Wozniak claims the trip will be "research" because the Hummer H1 Alphas will be powered by a hydrogen fuel cell. The "Zero South" expedition is to be a "race" between vehicles variously running on bio-fuel, the hydrogen fuel-cell and on electric

batteries. The expedition will travel 1600km up the trans-Antarctic highway built by Americans to the Pole. The trip is expected to take 10 days.

## Rabbits Wrecking Macquarie

**Agence France-Presse, 23 April 2007**—An explosion in the rabbit population has "trashed" Macquarie Island, conservationists say. They are calling on the government to implement a US\$21 million strategy to eradicate rabbits, rats and mice on the sub-Antarctic territory. Rabbits, introduced by sealers in the 1870s, until recently have been kept in check by cats (which were extirpated in 2000).

## World's Largest Nuclear Icebreaker Puts to Sea

**RIA Novosti, ST. PETERSBURG, 2 April 2007**—The largest nuclear-powered icebreaker in the world has put to sea and left St. Petersburg for Murmansk. The *50 Years of Victory* icebreaker, under construction since 1989, was successfully tested in February. An upgrade of the Arktika-class icebreaker, the 159-m, 25,000-metric ton vessel is designed to break through ice up to 2.8m thick.

## Que Sera Sera Gets Facelift

**Pensacola News Journal, 30 March 2007**—*Que Sera Sera*, the first aircraft to land at the South Pole, has been refurbished and is now on display at the National Museum of Naval Aviation, after being heavily damaged by Hurricane Ivan in 2004.

## Video of Erebus Flight Part of Art Exhibition

**Christchurch Press, 28 March 2007, by John Henzell**—Home video taken by a passenger on board the Air New Zealand flight that crashed into Mount Erebus in 1979, killing all 257 people on board, will form part of an exhibition at the Christchurch Art Gallery. The footage is included in "White Wall/Black Hole" by Auckland artist Stella Brennan, along with photos she took on a visit to the crash site.

## Japan Ship Returns Home With 508 Whales

**Associated Press, TOKYO, 23 March 2007, by Hans Greimel**—The Japanese whaling ship *Nisshin Maru* returned to port from Antarctica Friday with a catch of 508 whales, despite having its annual hunt cut short by a deadly fire. The hunt off Antarctica had been scheduled to continue through the end of March. It was the first time in 20 years that Japan had to abort a whaling mission. The six-vessel fleet killed 508 whales out of a target of 860. The meat will be sold for human consumption.

## Antarctic 'Sandbags' May Protect Ice

**Nature.com, 1 March 2007, by Michael Hopkin**—Antarctic ice is protected from the sea by rocky wedges of debris that act as "sandbags" to protect glaciers from rising waters, a radar survey of the final 25km of the Whillans Ice Stream, a 500-km-long glacier that sprawls towards the Ross Ice Shelf, has revealed. Researchers focused on the "grounding line"—the region where the ice stops flowing over land and passes out onto the floating ice shelf. Underneath this grounding line they found a pile of debris up to 31m thick, on top of which is a 10m bulge of ice. If much of Antarctica's ice is protected in this way, it may help to fend off ice melting as a result of rising sea levels.

## Buried Lakes Send Antarctica's Ice Slipping Faster

**National Geographic News, 21 February 2007, by Mason Inman**—Antarctica's ice sheets slide more quickly into the sea when they hit under-ice lakes, a new study shows. The slippery motion could have serious implications for the way ice sheets respond to global warming. Using satellite images and elevation data, researchers found

four new, large under-ice lakes at the start of a massive ice stream in East Antarctica. The new study, in tomorrow's *Nature*, focused on the 280km wide, 600km long Recovery Glacier ice stream. "We think that those subglacial lakes are the reason why these ice streams are there," said co-author Michael Studinger of Lamont-Doherty Earth Observatory. The lakes, buried deep below the miles-thick ice sheet, appear to provide water and heat that lubricate the ice sheet.

## Complex Plumbing System Found Beneath WAIS

**University of California-San Diego press release, 20 February 2007, by Chuck Colgan**—The recent discovery of a subglacial water system beneath the West Antarctic Ice Sheet (WAIS) is causing scientists to rethink the mechanisms that control the flow of ice streams into ocean. Reporting in Thursday's *Science* magazine online, scientists describe the sighting of a previously unknown region of subglacial lakes lying under the Whillans and Mercer ice streams, two fast-flowing ice streams about one kilometer thick. The study provides the first evidence that subglacial water is stored in a linked system of reservoirs underneath the ice and can move quickly into and out of those reservoirs, creating large changes over months. This activity may play a major role in controlling the rate at which ice moves off the continent.

## Female Seals Give Cold Shoulder to Local Males

**University of Cambridge press release, 7 February 2007**—Female Antarctic fur seals will travel across a colony to actively seek males which are genetically diverse and unrelated, rather than mate with local dominant males. These findings, published in this week's *Nature*, suggest that female choice may be more widespread in nature than previously believed, enabling species to maintain genetic diversity. Scientists studied a colony of Antarctic fur seals on South Georgia. They discovered that female fur seals will travel up to 35m to find a mate while the males will remain static, waiting to be chosen.

## Billionaires Cruise Antarctica in Octopus

**MercoPress.com, 6 February 2007**—Bill Gates and Paul Allen are currently on an Antarctica cruise in one of the world's most luxurious yachts. Allen's \$250 million, 126-m *Octopus* called in to Ushuaia over the weekend. The group plans to cruise the Antarctic Peninsula for 10 days before returning to Ushuaia, revealed Gustavo de Robles, head of Ushuaia port authority. *Octopus* carries seven boats, two helicopters and a 10-man submarine.

## Antarctic Hill Surprises Experts

**BBC News, 28 January 2007**—For the first time, a drumlin (a mound of sediment and rock) has been observed mid-formation. The streamlined, elongated hills form underneath ice-sheets as they scrape up material as they move. This is the first time an active one has been observed. It was found under the Rutford Ice Stream, a 2km thick, fast flowing ice stream, which drains part of the West Antarctic ice sheet, a team reported in *Geology*. "Suddenly, bam, this big mound had risen from the sea-bed. This was a really big surprise," explained Professor Tavi Murray, a glaciologist from Swansea University and one of the authors. The drumlin, still growing, now measures about 10m high, 100m wide and 1km long, and is enlarging 10 times faster than had been expected.

## Princess Anne Returns To Antarctica

**Antarctic Sun, 28 January 2007, by Kerry Kells**—Palmer station received an important visitor on 20 January: Her Royal Highness, Princess Anne,



the only daughter of Queen Elizabeth II and Prince Phillip, Duke of Edinburgh. The Princess Royal, patron of the U.K. Antarctic Heritage Trust, was on an eight-day tour of the Antarctic Peninsula aboard *HMS Endurance*. Stops included Rothera, Vernadsky, Palmer and several historic sites.

#### **Hillary Back for Scott Base Semicentenary**

**New Zealand Press Association, 21 January 2007**—Sir Edmund Hillary, reminding his audience that he was 87, recalled first trying Butter Point as the site for Scott Base in 1957, but when ice stopped his approach he turned to the U.S. Rear Admiral George Dufek, who suggested Pram Point. The admiral lent Hillary a helicopter, and when he stepped out, he thought "This is it." The young Hillary had started fundraising efforts in New Zealand to establish the base—which had inspired hundreds of New Zealanders to help, some schools adopting huskies for £50.

#### **Court Concur: Antarctica No 'Foreign Country' for Taxes**

**WebCPA.com, CHICAGO, 18 January 2007**—The Seventh Circuit court affirmed a U.S. Tax Court decision that the 2001 earnings of a U.S. citizen living in Antarctica are subject to federal taxes. When it comes to the foreign earned income exclusion, the court upheld a ruling that Antarctica does not qualify as a foreign country. While the Supreme Court had found Antarctica to be a foreign country for purposes of the Fair Labor Standards Act, both courts agreed that income earned on the continent is not excludable under Section 911 of the U.S. Tax Code. Read the ruling at [www.ustaxcourt.gov/InOpHistoric/Arnette.TC.WPD.pdf](http://www.ustaxcourt.gov/InOpHistoric/Arnette.TC.WPD.pdf).

#### **Police Say Pole Scientist May Have Been Deliberately Poisoned**

**www.stuff.co.nz, 13 December 2006**—An Australian scientist who died while working in Antarctica six years ago may have been deliberately poisoned, a coroner has heard. Christchurch Coroner Richard McElrea today reconvened an inquest into the death of astrophysicist Rodney David Marks, 32, who died at the South Pole station on 12 May 2000 after developing severe breathing difficulties and vomiting blood. His body was unable to be removed from Antarctica for six months over the winter period. An autopsy in Christchurch found that he died of acute methanol poisoning but the source of the methanol has never been discovered. Detective Senior Sergeant Grant Wormald, who headed the police investigation into Marks' death, detailed a large number of requests for information made officially to the U.S. National Science Foundation (NSF) and Raytheon Polar Services. Despite many promises of cooperation, little information had been provided by either organisation: "Despite numerous requests, I am not entirely satisfied that all relevant information and reports have been disclosed to the New Zealand police or the coroner." Wormald said there appeared to be four possibilities: Marks knowingly ingested methanol for "recreational effect"; he ingested it knowingly with the intention of committing suicide; he unknowingly ingested methanol accidentally, thinking it was something else; or he unknowingly ingested it, having had it introduced to his food or drink by a third person intentionally. "This could have been in the form of a prank or done with a more sinister intention," Wormald told the coroner. He said it was clear a "significant report" had been compiled by the NSF and investigations done into the circumstances of Marks' death, but "that information hasn't been forwarded to us." □

## **Calamari Rings Would Be the Size of Tractor Tires**

### **Biggest squid ever caught?**

**Seattle Post-Intelligencer, WELLINGTON, 23 February 2007, by Ray Lilley**—A fishing crew has caught a colossal squid that could weigh a half-ton and prove to be the biggest specimen ever landed, a fisheries official said Thursday.

The squid, weighing an estimated 990 lbs. and about 39 feet long, took two hours to land in Antarctic waters, New Zealand Fisheries Minister Jim Anderton said.

The fishermen were catching Patagonian toothfish, sold under the name Chilean sea bass, south of New Zealand "and the squid was eating a hooked toothfish when it was hauled from the deep," Anderton said.

The fishing crew and a fisheries official on board their ship estimated the length and weight of the squid; detailed, official measurements have not been made. The date when the colossus was caught also was not disclosed.

Colossal squid, known by the scientific name *Mesonychoteuthis hamiltoni*, are estimated to grow up to 46 feet long and have long been one of the most mysterious creatures of the deep ocean. If original estimates are correct, the squid would be 330 pounds heavier than the next-biggest specimen ever found.

"I can assure you that this is going to draw phenomenal interest. It is truly amazing," said Dr. Steve O'Shea, a squid expert at the Auckland University of Technology in New Zealand. If calamari rings



**An unidentified New Zealand fisherman shows off a giant squid caught early this month south of New Zealand. The creature, known as a colossal squid, is thought to be the largest ever found anywhere in the world, weighing an estimated 990 pounds, 330 pounds heavier than the next-biggest specimen. The fishing crew, catching Patagonian toothfish, took two hours to haul in the squid in Antarctic waters.**

were made from the squid, they would be the size of tractor tires, he added.

Colossal squid can descend to 6,500 feet and are extremely active, aggressive hunters, he said.

The frozen squid will be transported to New Zealand's national museum, Te Papa, in the capital, Wellington, to be preserved for scientific study.

Marine scientists "will be very interested in this amazing creature as it adds immeasurably to our understanding of the marine environment," Anderton said.

Colossal squid are found in Antarctic waters and aren't related to giant squid found around the coast of New Zealand. Giant squid grow up to 39 feet long, but are not as heavy as colossal squid. □



## Chinese Plan Work at Dome A



**Science, SHANGHAI, 16 March 2007,** by Richard Stone—Bo Sun remembers the first time he and his fellow Chinese struck out from Zhongshan Station on the East Antarctic coast, trekking inland across uncharted terrain in 1996. “It was terrible,” says Bo, a glaciologist at the Polar Research Institute of China (PRIC) in Shanghai. “Sometimes when we looked back, a big crevasse appeared. Our hearts jumped.”

But they learned—how to avoid getting stranded by forging ahead during a storm, for example, and what to eat on the energy-sapping traverses. Along the way, they’ve mapped major crevasse fields. “Now we are experts at recognizing where the dangers are,” says Bo. He and his colleagues in January 2005 reached their objective—the highest point on Antarctica’s ice sheets, Dome Argus (Dome A)—and returned home, completing the 2500km roundtrip in 10 weeks.

Radar echo soundings during the traverse suggested that the ice at the bottom of Dome A could be the oldest on the continent, going back as much as 1.2 million years, says PRIC Director Zhang Zhanhai.

During the International Polar Year (IPY) and beyond, China is set to really take off. In 2006, the government approved \$70 million for major polar projects, including \$4 million for IPY research in 2007; \$19 million for new PRIC headquarters in Shanghai; \$22 million to overhaul the Zhongshan and Great Wall stations; and \$25 million to renovate the *Snow Dragon (Xuelong)*, a Ukrainian-built research vessel that will cap IPY with a globe-girdling expedition to plumb the effects of rapid Arctic change on the mid-latitudes.

Chinese scientists’ 2005 radar soundings from Dome A, 4093m above sea level, revealed that the ice there astride the Gamburtsev Mountain Range is 3070m thick—twice what modeling had suggested, says Bo. In the next few years, China hopes to start drilling at Dome A to retrieve what could be an unparalleled window on past Antarctic climate.

*(PT Editor’s Note: An automatic weather station was installed at Dome A by the Australians in early 2005. Because Dome A is so much higher than Vostok (3448m), meteorologists expect that Dome A may soon break Vostok’s record for the lowest temperature recorded on Earth’s surface, -89.6°C. Dome A’s temperatures, it is believed, could reach as low as -95°C.)*

Finding ice that “captures our planet’s climate in a different phase ... is the Holy Grail of the ice-core community,” says Robin Bell at Columbia University’s Lamont-Doherty Earth Observatory, who concurs with PRIC’s estimated age of the Dome A ice.

The centerpiece of China’s IPY program is PANDA, a geophysics initiative at Prydz Bay near Zhongshan Station, and Dome A. In collaboration with researchers from five countries, China three years ago drilled a 310-meter ice core on the Amery Ice Shelf in Prydz Bay. Drilling will continue in 2007-08, and during a traverse to Dome A in late 2007, scientists will install a series of magnetometers to probe how the solar wind energizes electrons in the magnetosphere to form auroras.

Following up on the 2005 traverse findings, China is planning airborne radar map-

ping of the enigmatic Gamburtsevs and the overlying ice sheet with help from Aus-

tralian, German, U.K., and U.S. researchers. “We know little about the boundary of ice and rock,” says Bo.

Also during IPY, China will lay the groundwork for a major astronomy observatory at Dome A. Like the South Pole and Dome C, Dome A provides thin, clear skies ideal for serious stargazing. The Purple Mountain Observatory in Nanjing is teaming up with Australian and U.S. astronomers on a Dome A survey in 2007-08 to determine the best spot for a major telescope facility, and an array of four 15-cm telescopes will be installed to hunt for planets orbiting nearby stars. Later in 2008, PRIC will ship three 50-cm telescopes to Dome A that will provide the first picture of a large portion of the sky in polarized light, says Wang Lifan, director of the Chinese Center for Antarctic Astronomy.

In the short term, Zhang says, “nobody will winter over at Dome A.” Construction of a year-round station is set to begin in 2011, but for the next decade, the annual work window at Dome A will be narrow as the monthlong traverse leaves roughly two weeks on site. “There’s only a short time that the weather is suitable for people,” Bo says. “But the place is so fantastic.” □ *Editor’s Note: This story has been edited from the original.*





# COOL

by Cliff Bekkedahl

“Cool” seems to be this generation’s “hip” response to anything—indeed, everything—that’s O.K. or better (when you get beyond the range of “better,” then “awesome” takes over). Be that as it may, if you really want to see cool, then get up on <[www.rucool.org](http://www.rucool.org)>. Here you’ll find Rutgers University’s Coastal Ocean Observation Laboratory (COOL).

At the campus in New Brunswick N.J., COOL is the focal point for the operation of a squadron (eight) of underwater robotic gliders called Slocum gliders which are created and produced at a company called Webb Research Corp in Falmouth Mass. [see insert].

These gliders, as the specs indicate, are easily handled and can be launched and recovered from ships or small craft, and I predict that before long, they will be air-dropped by helo or slow-moving aircraft. The torpedo-shaped vehicle carries a small electric pump to introduce or discharge water from small ballasting tank(s). This determines the buoyancy of the glider. When water is taken in, the vehicle descends and the stubby wings stabilize and control a gliding descent. When the glider reaches its programmed depth, the pump reverses and expels water, and the glider starts its ascent. Reaching the surface, the process is reversed, and the glider begins to descend again. A sensor package in the glider does its work, which can vary depending on the mission. For example, the glider’s sensor can measure water temperature at varying depths, sal-

inity, chlorophyll or organic content of the water and other water characteristics. The robot glider describes a saw-toothed pattern, up and down while moving horizontally through the water. In a thirty- to forty-day mission a glider cycling to a depth of 300 feet and returning to the surface can traverse a distance of 400 to 600 kilometers.

Four times in the course of a 24-hour period—about every six hours or so—when the glider comes to the surface, it makes a satellite phone call to COOL at Rutgers and dumps its data collected since its previous report. This data is instantly analyzed and programmed for display and then broadcast on the Internet for use by any interested party worldwide. While doing its data dump, the glider’s navigational system connects with GPS and adjusts its course for travel over the next six hours. Built-in monitors can detect malfunctions in the robot glider and email COOL for help.

Rutgers scientists—a cool bunch of guys and gals from many disciplines—recently deployed a robot glider off the coast of Antarctica. Nowhere on earth are water and weather conditions more prone to extremes. This was an acid test of the integrity and durability of this system. It succeeded beyond all expectations. In less than a month of operation the robot glider phoned home more than 1,300 casts. By comparison, twelve years of previous shipboard research in the area produced only 1,600 casts.

It is currently estimated that there are about 79 of these Slocum gliders in the hands of scien-

tists the world over but mostly in U.S. universities and oceanographic laboratories like Scripps and Woods Hole. All users share data collected on the Internet, and the potential of this relatively inexpensive data collecting technology for advancing all of the ocean sciences is unprecedented.

Looking further into the undersea robot technology, one sees more sophisticated vehicles with solar powered or other self-contained propulsion systems. An autonomous underwater vehicle called *Endurance*, built by Stone Aerospace, a Texas-based company, is being readied to explore under ice-covered bodies of water, such as Lake Vostok, in Antarctica.

Clearly the technology is proven and the future of autonomous underwater vehicles is breathtaking. Their employment will hasten the horizontal alignment of the ocean sciences, and nowhere is this more evident than at COOL where scientists from a broad spectrum of disciplines, mechanical engineering, marine biology, oceanography, computer science, physics and meteorology jointly plan and execute robotic glider missions in ocean reaches the world over.

At a briefing of this writer at COOL at Rutgers, the enthusiastic faculty and graduate students present in the operation center described a typical Slocum glider mission using a real-time example of a mission currently under way. A glider had been launched just south of Cape Cod and was programmed to follow a southerly course along the Atlantic coast to a terminus point off the coast of New Jersey.

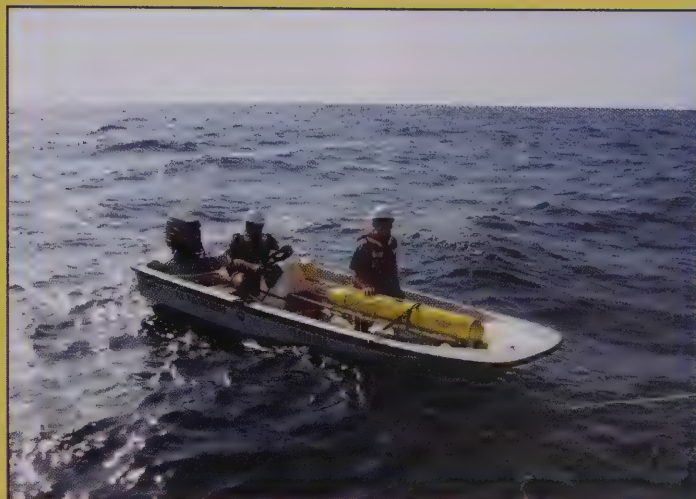


PHOTO COURTESY OF WEBB RESEARCH INC.

**The Slocum Glider is easily handled from a small craft.**

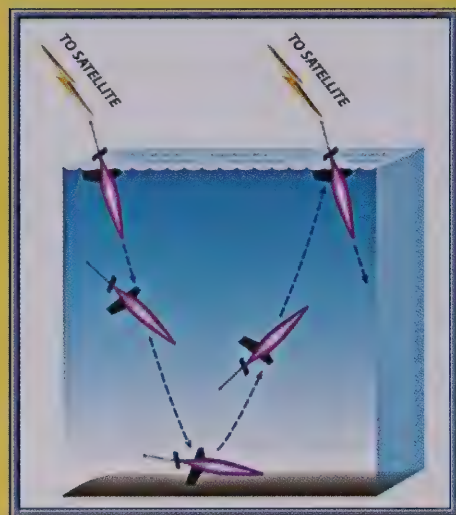


**COOL Squadron of Slocum Glider**

PHOTO COURTESY OF WEBB RESEARCH INC.



One of the mission specs was to take readings that measure the presence and health of phytoplankton, which is an essential in the marine life food chain. This information would be of value to federal and state fisheries authorities and, ultimately, to fisherman searching for concentrations of feeding fish. Only hours earlier the glider had entered the east-west shipping lanes to New York and European ports, and the staff was concerned that the glider might be surfacing in this heavily trafficked shipping lane. All were relieved when the anticipated call from the glider revealed that its position was south of the lanes, as programmed. With instant communications via satellite any where in the world, the staff at COOL can manage the glider, alter its mission and movement and respond to emails from the



**Slocum Glider "swims" in saw-tooth pattern**

glider that report malfunctions. Ask if the operation center was manned around the clock to monitor glider surfacing reports, everyone grinned and said "No way." Some one or two would have the after-hours and night duty, and they keep their laptops or home computers online to the operations center. If a robot failed to report in a reasonable time or if it emailed with a problem, this info would be signaled to the duty person who could either fix the problem or call cohorts to decide on a course of action.

What's next? Probably bigger robots, longer missions, deeper probes, larger sensor packages, aerial launching and retrieval and more robots in more places, more often. Indeed, one topic mentioned as we talked of the future was the development of a professional cadre of AUV operators planning and executing missions as required by ocean scientists from every discipline.

Readers of *The Polar Times* and APS mem-



WEBB RESEARCH CORPORATION • 82 Technology Park Drive • E. Falmouth, Massachusetts 02536-4441  
Telephone (508) 548-2077 FAX (508) 540-1686 • dwebb@webbresearch.com

## SLOCUM AUTONOMOUS UNDERWATER VEHICLE GLIDERS

Type: COASTAL or DEEP  
Objectives: Versatile, maneuverable deployment with 1-2 people  
Flexible payload  
Energy: 240 "C"-size Alkaline Batteries  
Range: 600 - 1500 km  
Endurance: 15 - 50 days  
Two versions: (4 to 200m) or (40 to 1000m)  
Navigation: GPS Waypoints, Magnetic Compass  
Communication: RF Modem, Iridium, ARGOS, Acoustic Modem  
Speed: .04 m/s (0.77 knot) Average Horizontal

### Glidors are unique in the AUV World

Forward propulsion is created by varying vehicle buoyancy. Wings and control surfaces convert vertical force into forward velocity so the vehicle glides downward when denser than water, and glides upward when buoyant. Gliders require no propeller and operate in a vertical saw-tooth trajectory.

The principal advantages of Autonomous Underwater Vehicle Gliders (AUVGs) are:

- Suitable for long-range and endurance, if low to moderate speed is acceptable.
- The saw-tooth profile is optimal for both vertical and horizontal observations in the water column.
- Regular surfacing enables GPS and two-way communication, no other navigational aids are required and the system is very portable.

### Navigation and Flight

The Slocum Battery Glider dead reckons to waypoints, inflecting at set depths and altitudes based on a programmed mission file. As set by the mission, the Glider periodically surfaces to communicate data and instructions and to obtain GPS location. Any difference in dead reckoning and GPS position is attributed to current, and that offset is compensated on the subsequent segment.

### Present Sensors:

Acoustic Modem  
Altimeter  
Bathypotometer (bioluminescence)

### Optical Backscatter

Optical Attenuation  
Scattering Attenuation Meter  
Radiometer  
Oxygen

### Conductivity, Temperature, Depth

Fluorometer  
Hydrophone & Towed Arrays  
PAR sensor  
Spectrophotometer (red tide detection)

Conceived by Douglas C. Webb and supported by Henry Stommel and others, the class of Slocum Gliders is named after Joshua Slocum, the first man to single-handedly sail around the world.

It is a uniquely mobile network component capable of moving to specific locations and depths, occupying controlled spatial and temporal grids. Driven in a sawtooth vertical profile by variable buoyancy, the glider moves both horizontally and vertically.

The long range and duration capabilities of the Slocum gliders make them ideally suited for subsurface sampling at the regional scale. The Slocum gliders can be programmed to patrol for six weeks at a time, surfacing to transmit their data to shore while downloading new instructions at regular intervals, at a substantial cost savings compared to traditional surface ships.

The small relative cost and the ability to operate multiple vehicles with minimal personnel and infrastructure will enable small fleets of Gliders to study and map dynamic (temporal and spatial) ocean features around-the-clock and calendar. □

bers should have little difficulty imagining the value and rich scientific rewards to be attained by further operation of AUVs in the cold, stormy and ice covered waters north and south of sixty degrees latitude. Intensive



**Slocum Glider on surface, ready to dive.**

operations with multiple launchings and retrievals will require a mother ship or some sort of aerial recovery unit(s). However, obvious factors, such as stand-off capability, low risk to personnel and equipment and the ability to launch, retrieve and service multiple units, will reap vast amounts of oceanographic data at drastically reduced costs. And just as we are seeing major advances being made in the field of unmanned aircraft and space vehicles, the autonomous underwater vehicle will take a leading role in exploration and scientific investigation of the oceans that cover seventy percent of the world's surface. □

For more information about the Slocum Glider, visit the following web sites: [www.rucool.org](http://www.rucool.org) and [www.webbresearch.com/slocum](http://www.webbresearch.com/slocum) (be sure to type two "b's" for the latter).



# Victim of Climate Change, a Town Seeks a Lifeline



Newtok, Alaska, in spring, as viewed from its water tower. Boardwalks squish into the muck in Newtok, which erosion has turned into an island.

*New York Times*, NEWTOK, Alaska, 27 May 2007, by William Yardley—The sturdy little Cessnas land whenever the fog lifts, delivering children's bicycles, boxes of bullets, outboard motors and cans of dried oats. And then, with a rumble down a gravel strip, the planes are gone, the outside world recedes and this subarctic outpost steels itself once again to face the frontier of climate change.

"I don't want to live in permafrost no more," said Frank Tommy, 47, standing beside gutted geese and seal meat drying on a wooden rack outside his mother's house. "It's too muddy. Everything is crooked around here."

The earth beneath much of Alaska is not what it used to be. The permanently frozen subsoil, known as permafrost, upon which Newtok and so many other Native Alaskan villages rest, is melting, yielding to warming air temperatures and a warming ocean. Sea ice that would normally protect coastal villages is forming later in the year, allowing fall storms to pound away at the shoreline.

Erosion has made Newtok an island, caught between the ever widening Ninglick River and a slough to the north. The village is below sea level, and sinking. Boardwalks squish into the spring muck. Human waste, collected in "honey buckets" that many residents use for toilets, is often dumped within

eyesight in a village where no point is more than a five-minute walk from any other. The ragged wooden houses have to be adjusted regularly to level them on the shifting soil.

Studies say Newtok could be washed away within a decade. Along with the villages of Shishmaref and Kivalina farther to the north, it has been the hardest hit of about 180 Alaska villages that suffer some degree of erosion.

Some villages plan to hunker down behind sea walls built or planned by the Army Corps of Engineers, at least for now. Others, like Newtok, have no choice but to abandon their patch of tundra. The corps has estimated that to move Newtok could cost \$130 million because of its remoteness, climate and topography. That comes to almost \$413,000 for each of the 315 residents.

Not that anyone is offering to pay.

After all, climate change is raising questions about how to deal with drought, wildfires, hurricanes and other threats that affect so many more people and involve large sums of money.

"We haven't sat down as a society and said, 'How are we going to adapt to this?'" said Michael Oppenheimer, a climate scientist at Princeton University and a lead author of a recent report by a United Nations panel on the impacts and vulnerability presented by climate change. "Just like we haven't sat

down and said, 'How are we going to reduce emissions?' And both have to be done."

Amid the uncertainty, the residents of Newtok hear the skeptics, who question the price tag for moving such a small, seemingly inconsequential place. But residents here emphasize that they are a federally recognized American Indian tribe, and they shudder when asked why they cannot just move to an existing village or a city like Fairbanks.

They say their identity is rooted in their isolation, however qualified it has become over the last century by outside influences. It was the government, they say, that insisted decades ago that they and so many other villages abandon their nomadic ways and pick a place to call home. The current village site was once only a winter camp, and the people of Newtok say they are not to blame just because they are now among the first climate-refugees in the United States.

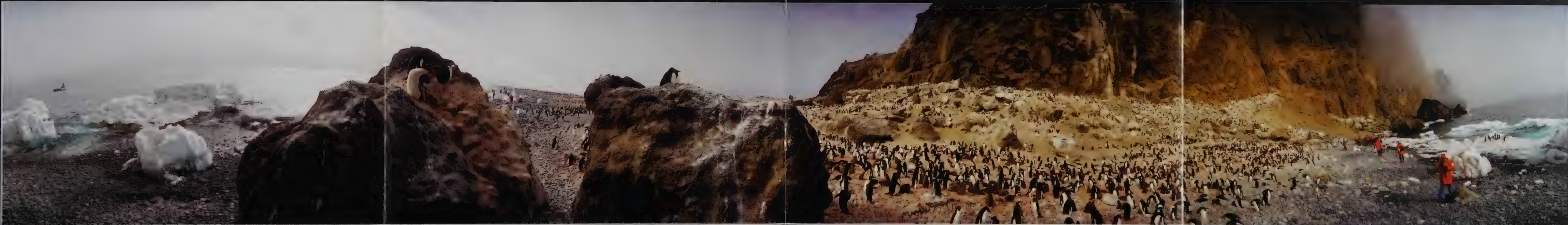
"The federal government, they're the ones who came into our lives and took away some of our values," said Nick Tom Jr., 49, the former Newtok tribal administrator. "They came in and said, 'You aren't civilized. We're going to educate you.' That was hard for our grandparents."

Newtok's leaders say the corps' relocation estimates are inflated, that they intend to move piecemeal rather than in one collective





We are privileged to have panoramic photographer Everen T. Brown share with us two of the many magnificent images he has captured of Antarctica. They are titled "Petermann Island" (above) and "Possession Island" (below). Everen uses the Globuscope camera, which creates a full 360-degree image. The images can be reproduced as gigantic prints. One can also put them on a computer and view them as virtual reality (VR) images, providing the viewer with a "you-are-there" feeling. Everen is currently working on the world's first 360-degree world atlas that will allow viewers to travel the globe visually in virtual reality. A thousand images will be in the atlas, and over 90 of those images will feature Antarctica, in the initial release in September 2007. The 360 World Atlas will be available to the general, and a special edition will be available to schools. Everen would like to create a more in-depth version of the Atlas that centers on Antarctica. He has been working to get accepted into the Antarctic Artists and Writers Program to make this project a reality. If anyone in the polar community has opportunities to assist him in accessing areas of Antarctica that could be of educational interest, please call him at (801) 364-2642. Also, be sure to visit the web site <[www.360atlas.com](http://www.360atlas.com)>.

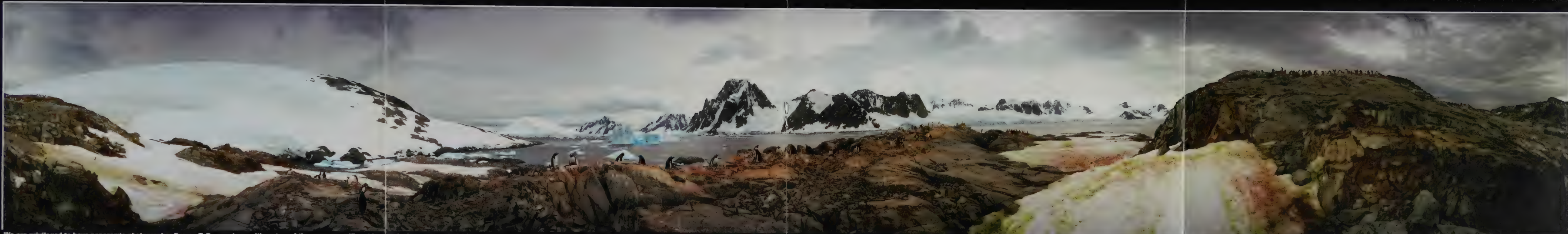


360° ANTARCTICA

Possession Island

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migration, which they say will save money. But they say government should pay, no matter the cost—if only there were a government agency charged with doing so. There is not a formal process by which a village can apply to the government to relocate.

"They grossly overestimate it, and that's why federal and state agencies are afraid to step in," said Stanley Tom, the current tribal administrator and the brother of Nick Tom Jr. "They don't want to spend that much money."

Still, Newtok has made far more progress toward moving than other villages, piecing together its move grant by grant.

Through a land swap with the United States Fish and Wildlife Service, it has secured a new site, on Nelson Island, nine miles south. It is safe from the waves on a windy rise above the Ninglik River. They call it Mertarvik, which means "getting water from the spring." They tell their children they will grow up in a place where E. coli does not thrive in every puddle, the way it does here.

With the help of state agencies, it won a grant of about \$1 million to build a large landing at the new site. Bids go out this summer, and construction could be complete next year, providing a platform to unload equipment for building roads, water and sewer systems, houses and a new landing strip.

Village Safe Water, part of the State Department of Environmental Conservation, plans to use money budgeted for repairs at the existing village to drill for water this summer at the new site. The corps is drafting a plan to build initial roads and an emergency center that would serve as a base of operations during construction. But the plan, for which the corps has not yet released a budget, needs financing from Congress.

There is no plan yet for how the village would move entire buildings, such as the Newtok School, which is relatively new and serves the village's 125 children, preschool through high school.

So far, said Sally Russell Cox, a planner with the state division of community advocacy, "This is all on sticky notes."

Senator Ted Stevens, the lion of Alaska politics, is now the ranking minority member on the Senate's new Disaster Re-

covery subcommittee.

His aides say that, while he has yet to push for money to move specific villages, he was instrumental in passing legislation in 2005 that gave the corps broader authority to help. Despite the state's past success at winning federal money, they say Alaska lawmakers are hemmed in by new scrutiny of so-called earmarks for special projects, Mr. Stevens's status in the minority of the new Congress, public detachment from issues facing rural Alaska and needs in other places, like New Orleans.

And village relocation in Alaska is not a priority at the White House. The president's proposed budget includes \$1 million that could go to that purpose, White House spokeswoman Dana Perino said Saturday.

Bruce Sexauer, a senior planner with the corps in Alaska who wrote a report assessing the needs of various villages, said the residents of Newtok are descendants of the people who came across the land bridge from Asia. "They

residents take nightly steam baths. An elderly man drains kerosene into a puddle of snow-melt. Children pedal past a walrus skull left to rot, tusks intact, in the mud beside a boardwalk that serves as a main thoroughfare. There are no cars here, just snow machines, boats and all-terrain vehicles that tear up the tundra.

Village elders speak their native Yupik more often than they speak English. They remember when the village was a collection of families who moved with the seasons, making houses from sod, fishing from Nelson Island in the summer, hunting caribou far away in the winter.

But, said Agnes Tommy, "It's getting hard to remember."

On a recent afternoon, Ms. Tommy, 84, watched a DVD of "The Day After" while her 17-year-old granddaughter, Nicole, a high school dropout, sat across the room with Eminem's "Encore" thumping in her headphones. Nicole

mused about moving to Anchorage, although she has never been there.

Many men still travel with the seasons to hunt and fish. Some will take boats into Bristol Bay this summer to catch salmon alongside commercial fishermen from out of state. But the waterproof jacket

sewn from seal gut that Stanley Tom once wore is now stuffed inside a display case at Newtok School next to other relics.

Now Mr. Tom puts on a puffy parka to walk the few hundred feet he travels to work. He checks his e-mail messages to see if there is news from the corps or from Senator Stevens while his brother, Nick, sketches out a budget proposal for a nonprofit corporation to help manage the relocation, presuming the money arrives.

Nick Tom said the move could bring jobs for young people who may otherwise be tempted to leave. Other young people talk only of leaving for the new village.

"They're going to move us to a mountain," said Annie Kassaiuli, 11, eating a burrito in the school cafeteria. "We can pick berries." □



are the very first of the people that were inhabiting North America thousands of years ago. Talk about a rich and unique American culture. Is it worth it? There's more to it than just economics."

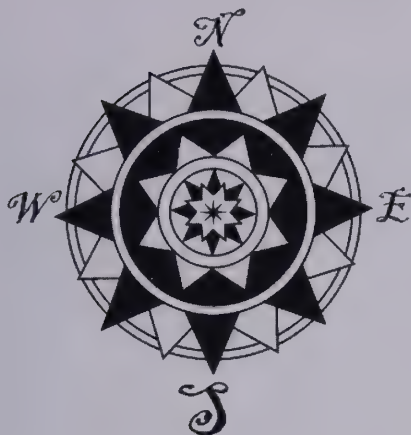
The administrative leaders of Newtok are mostly men in their 40s, nearly all of them related. They are widely praised by outsiders for their initiative and determination to relocate.

Yet nearly any place would seem an improvement over Newtok as it exists today, and not all of its problems are rooted in climate change. Some are almost universal to Alaskan villages, which have struggled for decades to reconcile their culture of subsistence hunting and fishing with the expectations and temptations of the world outside.

Excrement dumped from honey buckets is piled on the banks of the slow-flowing Newtok River, not far from wooden shacks where



# Due North



## 'Arctic Editor' Position Still Open, To Be Filled Soon

by Cliff Bekkedahl, Managing Editor

The position of Arctic editor remains unfilled, but this will be remedied before the next issue of *The Polar Times*.

Several people have expressed interest in taking on the responsibility, and others have been recommended who are being contacted to see if there is a match. Much of this activity was generated at the Symposium in April.

Dave Norton, our former Arctic Editor, kept our attention focused on affairs north of the Arctic Circle and often did so when dra-

matic and compelling events in Antarctica could have easily gobbled up the pages of *The Polar Times*. The touchstone of our editorial policy—if, indeed, there is such a thing—is to keep a balance in our presentation of polar affairs, and our next editor will be grounded in this commitment. Climate change, environmental problems, energy and people issues will draw more and more attention to the North than ever before. *The Polar Times* will be there. □

## Advancing Water Poses Threat to Eskimo Villages

**Associated Press, 26 December 2006, NEWTOK, Alaska**—The last time chronic flooding forced this tiny village to relocate, sled dogs pulled the old church to its new home three miles away, far from the raging Ninglick River. That was in 1950.

Half a century later, the river has again crept to the edge of this community of Yupik Eskimos. Persistent erosion has eaten an average of 70 feet of riverbank a year, and melting permafrost is subsiding, further subjecting the village to severe flooding from intensifying storms.

So once again Newtok must move, leaving residents and officials grappling with a crisis that looms over scores of Native Alaskan villages along the state's western coast.

These once-nomadic people can no longer pack up and go. The crucial difference this time: finding the money to move and to replace millions of public dollars invested in schools, clinics and government offices. Replacement costs are beyond the reach of these remote communities, which typically rely on subsistence foods for economic survival.

"We can't even move an inch without any money," Nick Tom, former Newtok tribal administrator, said as he led visitors through mud and snow, pointing out shifting houses

and crumbled soil along the Ninglick.

The problem is taking on a new urgency as the effects of climate change escalate. Erosion and flooding affect 184 of 213 Native Alaskan villages to some degree, according to a 2003 report by the Government Accountability Office, and the Army Corps of Engineers is trying to determine which communities need the most help from a network of state and federal agencies.

"When there is a problem that develops over years and decades, such as Alaskan erosion, the perception of urgency is not as acute," said Bruce Sexauer, a senior planner with the corps. "The impacts of a hurricane can be felt nationwide, whereas similar situations in remote communities are oftentimes only known by a select few."

Newtok and two other western Alaska villages, Shishmaref and Kivalina, face the shortest life spans at their current locations. Some officials believe that conditions are most urgent in Newtok, tightly wedged between two rivers. The vast, rushing Ninglick has cut into the smaller Newtok River, turning it into a slough. This is the sewage dumping place for Newtok's 315 residents, who have no indoor plumbing and use buckets as toilets.

Compounding the problem, fall storms

send floodwaters surging through the Ninglick and up the Newtok, turning the village into an island, said Brenda Kerr, the Newtok planner for the Corps of Engineers.

"The water is scary enough in and of itself, and then you consider what's in it," Ms. Kerr said of the public health concern.

Newtok is ahead of other villages facing a need to move, having completed a federal land trade in 2004 for a hilly area called Mertarvik on Nelson Island nine miles to the south. But that is just on paper. The corps estimates that moving would cost as much as \$130 million, or more than \$412,000 a resident. That cost reflects the challenge of carrying some existing structures and tons of construction supplies to undeveloped tundra to build a new community.

"I think there's very little likelihood that the federal government or the state government could come up with \$150 million to say, 'O.K., Shishmaref or Newtok or Kivalina, we're going to move you next year,'" said Gary Brown of the state's emergency management office. "When you look at the numbers, it's kind of staggering. But if a community can figure out a way through the maze of political processes to do it incrementally, it might be more palatable." □

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# The Musk Ox Story

## A Seventy-five Year Chronicle of Alaska's Amazing Native Wool Industry

by Herbert R. Drury

**"L**ook out, they're getting away," someone yelled, and I barely had time to dive behind a large boulder as a giant *Ovibos moschatus* leapt over me. How many people can say they have seen the underbelly of a nearly half-ton, wild Canadian musk ox as it bounded over them in the Arctic wilderness?

The story goes back to 1930 when a small herd of polar musk oxen were rounded up in Greenland as part of an early attempt to study and domesticate the little known species. This strange, hairy mammal, resembling a bison, but with heavy horns more like those of an African water buffalo, is a circumpolar, bovine-type animal somewhat related to sheep, goats and cattle. Yet it is a separate species unique in the world, with fossil remains from Alaska to Tennessee that suggest its early forms were contemporaries of the mammoth. Its former range included arctic and subarctic regions of North America, Greenland, Scandinavia and Russia but has seriously declined in modern times. These creatures finally became extinct in large areas of their ranges for various reasons, not the least of which were depredations by native peoples, whalers and early explorers who often lived on their meat, fur and bone products. Musk oxen have the unenviable habit of forming a defensive circle when attacked, with adults facing out and



**Herbert R. Drury with three musk ox calves on Vermont farm of John J. Teal Jr., Winter, 1954-55 (photo by John J. Teal Jr.)**

their young protected within the herd. All of which tends to work well with non-human predators, but makes them totally vulnerable to men with spears, arrows or guns, even though they can run as fast as bison, horses or most other large mammals.

At the request of the State of Alaska to the Federal Government in 1927, some hunters were hired to capture thirty-four calves and yearlings on the barren tundra of Greenland, ship them to Norway, then to America, across the nation, and finally up to Fairbanks, Alaska, in 1930. There they were studied for five years at the university. Eventually, however, they were barged down the Yukon River and relocated to the relatively safe environment of Nunivak Island, off the west coast of Alaska, where there were no natural predators. By 1983 the herd had increased to 490 animals.

A man named John Teal, Jr., now deceased, became interested in the idea of domesticating these wonderful animals, first suggested by the late North American Arctic explorer, Vilhjalmur Stefansson, early in the last century. Teal tried for eight years to get permission from the Canadian government to capture some oxen, without hurting any adults or young, in the northern Arctic islands of the

Northwest Territories. He was finally allowed to obtain eight calves in the Thelon Game Sanctuary west of Hudson Bay. In August 1954, Teal mounted an expedition of nine men that included a Canadian Wildlife Officer (to assure no harm came to any of our prey), a *Life* magazine photographer who produced a photo article in the September 27, 1954, issue, and an ABC TV cameraman who produced a short documentary film that was sold to RKO Pathe. Ironically, he was related to one of Stefansson's contemporary explorers. I became a last-minute member by a series of events while a graduate student at the University of Michigan. I had been on two previous expeditions to Greenland and the high Arctic islands of Canada where I had an earlier encounter with a large bull musk ox. Other than Teal, I was the only American member of the group, except possibly the professionals, who had ever actually seen one of these unique mammals.

One of my fisheries professors had just returned from an expedition to the Thelon Sanctuary with the head of the Canadian Wildlife Service to examine that remote, uninhabited area. He showed me some of their photos of polar caribou, white wolves, barren



**Adult bull musk ox in Thelon Game Sanctuary, Northwest Territories, Canada. Fall, 1954. (photo by Herb Drury)**



ground grizzly bears and musk oxen, among the many species that have been officially protected there since the early 1900's. It is an area too far north to contain any Indian peoples and too far inland from the sea to have any Eskimos, and was found to have few minerals or other values to attract humans. It was established there because it is such a perfect place for wildlife security. Only a few exploratory expeditions had ever entered this reserve, and ours eventually joined that privileged group.

I was hired, while home in Vermont for the summer, to assist the president of the University of Vermont Outing Club in transporting some \$10,000 worth of camera equipment and baggage on the train from Montreal, Quebec, to Edmonton, Alberta, where we were to meet the other members of the group and fly to Yellowknife, in the Canadian Northwest Territories. From there we flew in two float planes to an unnamed lake well above "tree-line" (the edge of the great "Taiga" or northern forests of the Canadian Shield), where a remnant bit of timber grew on a peninsula out into that lake. We set up our tent camp on the shore, elated by having seen herds of oxen on the long flight from Great Slave Lake, a few hundred miles west.

We tried various methods of capture unsuccessfully for several days in the waning light of summer amid swarms of biting insects. Our limited time on the tundra was running out, and animals were getting increasingly hard to find, even from the air. In desperation we attempted to capture an adult bull by building a log corral and herding him into it. But he went through the heavy tree trunks like they were not even there and led us on a canoe chase across the lake where we unsuccessfully tried

to subdue him. Eventually we worked out a capture technique using the expensive float planes that periodically flew out from Yellowknife. They helped us locate herds with calves that were near one of the hundreds of small lakes in the area containing a short, narrow peninsula. The planes would land our crew on the lake where we lined up along both sides of the land and hid there waiting to ambush our prospective captives. The pilot, usually an ex-navy aircraft carrier veteran, would fly over the nearby herd and "dive bomb" it so skillfully that the bunch tended to run toward our ambush site. Sometimes they even tried to jump up and gore our low-flying aircraft with their massive horns!

Occasionally, after expending many costly air miles, the flyers succeeded in driving a herd out onto the chosen peninsula and the men would close in behind them, yelling and waving arms in order to scare them into the water. We had also sequestered a canoe there which had been carried in on a pontoon. If the terrified oxen entered the water, two people would jump into the frail craft and pursue the swimming crowd, attempting to separate out a calf. One man would then jump into the water and try to grab the little one's legs. If he succeeded, the other crewman paddled up to them and dragged the reluctant captive aboard to be hog-tied and landed on shore.

I was nearly run over by an escaping adult when, as happened occasionally, the mystified leaders refused to get wet and gave us the "end run" around our skimpy line of advancing tormentors, sometimes blasting right through to freedom. Disappointment was intense when this happened, due to time and money lost, and the wide dispersal of suitable herds. Finally, after a month of effort, we managed to obtain one small bull (about 80 to 100 pounds), and two heifers, (about 100 to 125 pounds each), at a cost of around ten thousand dollars per head. Once we got the three babies into the log corral we built for them, the little guys tried their best to butt us into oblivion and "even the score," as Teal



**John Teal Expedition members feeding newly captured musk ox calf. Thelon Sanctuary, Northwest Territories, Canada. 1954. (l. to r., Ernest Paquette, veterinarian; Edward Salvas, U. VT. Outing Clubs President [with hat]; John. J. Teal Jr.)**

put it. But when they tasted the sugar-milk our veterinarian force-fed them out of a baby bottle, everything changed. Within twenty-four hours or less they came willingly to us seeking more of the sweet stuff and never once tried to harm anyone again. They proved to be super-intelligent wild mammals and later became the tamest animals on Teal's farm, even sharing the pasture with domestic cattle, dogs and children. A second expedition the next year produced four more captives, enough to begin the process of domestication on Teal's 600-acre farm near Burlington, Vermont.

At the appointed time we were picked up by a float plane and flown back to Yellowknife. I had to lie on top of the pile of three hog-tied calves, no longer so wild, until we landed and built wooden crates for each one. We were then flown to Winnipeg, Manitoba, by commercial airliner, crates and all. Teal even somehow talked a Canadian military transport into taking us to Montreal, Quebec. There I had the pleasure of bedding down with our captives in a hangar at Dorval Airport overnight. Someone always slept with them, not only to help the calves get used to humans but to protect them from the wolves and grizzly bears that frequented our wilderness camp, as well as any would-be bandits in civilization. The final commercial flight landed us in Burlington, Vermont. There a truck soon took us to Teal's farm that was already fenced and waiting.

Domestication work, under Teal's newly formed "Institute of Northern Agricultural Research," continued over the next few years with seven or more growing musk oxen, which

*CONTINUED ON P. 28*



**Veterinarian Ernest Paquette feeding sugar-milk to newly captured musk ox calf at John Teal campsite, Fall 1954. (photo by Herb Drury)**



incidentally, are not really oxen and have no musk. Teal's idea was to develop a supply of animals that could, like the reindeer of Scandinavia, provide a new means of livelihood for polar inhabitants as a kind of "cottage industry." Although the *Ovibos moscatus* provides meat comparable to that of cattle and bison, it is far too rare and valuable to be utilized that way. The real value is in its under-wool, called "Qiviut" by the Eskimos, which is shed through its long outer hair that reaches nearly to the ground. This is among the world's finest wools, as soft as cashmere, vicuna and other natural fibers. It accepts any dye but is much nicer in its natural beige color, will not shrink and is readily spun into yarn for knitting. A cashmere goat is said to yield a few ounces of wool. An adult musk ox, of 600 to 800 pounds, can produce up to six pounds of qiviut every spring. It does not need to be sheared because it is shed naturally and can easily be combed out in a simple barn stall without resistance by the animal.

In 1975 and 1977, John Teal developed a large herd near Unalakleet in western Alaska that numbered 125 head by 1983. I lost touch with the group for several years while raising my own family but did occasionally correspond with John. He had gone to Nunivak Island in 1964 and 1965, where he obtained 33 more animals, all descendants of the original herd transplanted from Greenland in 1930. Once again, however, Teal had his problems catching the fleet-hoofed critters since there were few bodies of water on that island like we'd had in Canada. He was eventually forced to bring in an expensive helicopter to drive the fleeing oxen into the sea, but not until the water warmed up later in the season. There they could be captured by boat or canoe, much as we did in 1954, and Teal eventually got his animals for domestication. This expedition was also documented in a film narrated by the late Charles Kuralt.

In 1984 I happened to meet a man in Colorado who said he was a pilot and that he had flown several musk oxen from Alaska to Russia, presumably at that nation's request. Others were eventually taken to various parts of Alaska where the native populations of those ruminants were depleted or extinct. Another herd was eventually established near old Fort Chimo in northern Quebec, Canada, and is reported to be doing well there in the wild. A few musk oxen also may still exist in animal parks or zoos in North America or elsewhere, but this can change over time.

Once Teal's herd grew large enough, their

wool was collected and sent out to be cleaned and spun into yarn. It was then returned and farmed out to over two hundred native Alaskan women who were taught to knit, an entirely new experience for them. Indians and Eskimos have always been hunters whose women stitched hides together for clothing, but few, if any, ever learned to knit. Now, thanks to John Teal and his new "Institute," there is, as he had hoped, a small, growing industry along the Alaskan coast where exceptional garments of musk ox "qiviut" wool are produced and sent to the Oomingmak Cooperative in Anchorage for marketing locally and by mail order. "Oomingmak" is the Eskimo name for the "the bearded one," or musk ox. These delightful garments are limited in type and quantity, very expensive, highly utilitarian and uncommonly beautiful. They include

**Unique Alaskan Gifts** **Native Owned since 1969**



**QIVIUT**  
ALASKAN HANDKNITS at  
**OOMINGMAK**



in  
**Downtown Anchorage**  
**1-888-360-9665**  
**www.qiviut.com**

small knit hats, hoods, scarves, and vests, each made with the unique pattern of the local village where it is knitted. The scarves are said to be so pliable they can be drawn through a wedding ring! Most can be compressed into an amazingly small space to easily fit into one's pocket and are incredibly soft, warm and attractive.

After several years in Unalakleet, the herd was moved to Talkeetna, Alaska. Soon thereafter, a farm became available outside Palmer, Alaska, about 50 miles from Anchorage, where these animals exist today. The wool is harvested by volunteer workers, and selected products are sold there. One can become a "Friend of the Musk Ox" and receive an occasional newsletter detailing anecdotes about some of these furry local characters and their progress in the new quarters. At one point I tried unsuccessfully, as have a few others, to market qiviut in the Aspen, Colorado, area,

where there had been an earlier outlet. Some other stores, including one in Breckenridge, Colorado, where I once lived, and two or three at airports, also have tried to sell these marvelous items. But many, if not all, seem to have gone out of business, perhaps due to the high cost and uniqueness of these goods. The best way to obtain them is still through the Anchorage store.

The fame of these fine garments is gradually spreading, in part because tour buses now stop at the "farm" in Palmer, where the wondrous oxen live in the relative luxury of barns and fenced pastures. In the wild these animals do not need any kind of shelter even in the severest weather. They survive on lichens, willows and small tundra plants in the shallow snows of frigid arctic "deserts." But now they are "domesticated" and must be fed daily, just like cows. They've become Alaska's "Arctic cattle," delighting farm visitors, many of whom probably had never even heard of a musk ox before, and providing a rare but useful product, as well as a living for otherwise struggling coastal natives. John Teal succeeded in creating a truly amazing new and unique wool industry for our 49th state, and these unusual creatures will probably never again become extinct in the Polar Regions, thanks, at least in part, to his inspiration. □

*Author Herbert Drury was raised in Hanover, N.H., and graduated from Dartmouth in 1952. A lifelong outdoorsman, Herb has Master's Degrees in Conservation [Univ. Mich.1955] and Botany/Zoology [St. Univ. So. Dakota]. In those early years, he was a member of four expeditions to Arctic Canada and Greenland. He taught biology and general science in New England schools at all levels for twenty years and then relocated to Colorado where, semi-retired, he worked outdoors in a variety of endeavors, including trout fishing guide. Skiing was a major activity in his life and has continued into his senior years.*

*Herb is long-time member of The American Polar Society and has promised The Polar Times more articles based on his adventures in Arctic regions.*

*He now lives in Big Bear, Calif., where he stays busy with volunteer work, writing, and traveling.*

#### **Current Locations Where Musk Oxen Can Be Visited In Alaska**

1. The Large Animal Research Station (LARS), University of Alaska Institute of Arctic Biology, Yankovich Road, Fairbanks, AK 99775. Telephone: (907)474-7207. Scheduled public tours offered in summer on a limited basis, or by arrangement.
2. The Musk Ox Farm, Route 1, just east of town, on the Glennallen Road. P.O. Box 587, Palmer, AK 99645. Telephone: (907)272-9225. Summer tours available, and others by arrangement. Website: [www.muskoxfarm.com](http://www.muskoxfarm.com), and e-mail: [moxfarm@alaska.net](mailto:moxfarm@alaska.net). □



# Alaska to Pay Pilots in Plan To Kill Wolves

**New York Times, 22 Mar 2007, by William Yardley**—Alaska will pay pilots licensed to shoot wolves from the air \$150 for each wolf they kill under a new plan intended to protect their prey, including moose and caribou, state wildlife officials said yesterday.

Efforts to control the wolf population have been complicated this year by rough winds, limited snow and higher fuel prices, making it harder to follow wolf tracks and more difficult and expensive to fly, said Ron Clarke, assistant director of the state's Division of Wildlife Conservation. So far this year, 98 wolves have been reported killed. State officials have a goal this year of killing 382 to 664 wolves in five key areas, Mr. Clarke said. The state said Wednesday that another reason shootings had declined this year was the success of control efforts in the past.

The aerial shooting program has been controversial since it began in 2003. At the time, moose populations had declined by about 50 percent over the previous two decades, af-

fecting sport hunters and people who rely on moose for sustenance, said Bruce Bartley, a spokesman for the Alaska Department of Fish and Game.

"We have more wolves in Alaska than in the entire rest of the states combined," Mr. Bartley said. "Everyone's so fearful that we're out to obliterate the wolves. It's just not true."

*"Everyone's so fearful that we're out to obliterate the wolves. It's just not true."*

Wolves number from 7,700 to 11,200 in Alaska, according to the state. Heavy snow in past years weakened moose and caribou populations in some areas, leaving them more vulnerable to wolves and creating what is known as a "predator pit." State officials say they cannot recover without aggressive control of wolves.

But Karla Dutton, director of the Alaska office of Defenders of Wildlife, issued a statement on Wednesday saying the group was "outraged" by the decision. "Bounties have no place in modern wildlife management and undoubtedly would lead to the illegal killing of wolves," Ms. Dutton said. She said her group believed wolf shootings had declined this year because the population is actually lower than the state estimates.

Permits have been awarded to 111 pilots and 144 gunners to shoot wolves from fixed-wing aircraft, largely in remote, interior areas of the state. Pilots and their gunners sometimes shoot from the air, flying at very low speed and altitude, while other times they may land near a pack and then shoot.

The reward for shooters has typically been the wolf's pelt, but Mr. Bartley said the challenges and costs of flying had reduced the motivation of some pilots and prompted the state to offer payment this year. □

## Work Starts on Arctic Seed Vault

**Reuters, LONDON, 9 February 2007**—Deep inside the Arctic Circle work is about to begin on a giant frozen Noah's Ark for food crops to provide a last bastion in the battle against global warming.

And within a year the first seeds of what will eventually be home for samples of all 1.5 million distinct varieties of agricultural crops worldwide will be tucked safely inside the vaults deep in a mountain on the archipelago of Svalbard.

There, at the end of a tunnel 120 meters into the side of a mountain, 80 meters above estimated sea levels even if all polar ice melts, and 18 degrees Celsius below freezing, they will stay like a bank security deposit.

"It will be the best freezer in the world by several orders of magnitude. The seeds will be safe there for decades," said Cary Fowler of the Food and Agricultural Organization's Global Crop Diversity Trust.

"Svalbard is a safety backup—and we hope we never have to use it."

The Norwegian government is footing the \$5 million construction bill and the Global Crop Diversity Trust is providing the estimated \$125,000 a year running costs.

"We are going back to the older varieties because that is where you find the largest ge-

netic diversity ... and diversity is protection," Fowler told Reuters in London.

Svalbard will not find and sort the seeds. That is being left to the various seed banks around the world in the front line of the battle to protect biodiversity.

The function of the Arctic Noah's Ark will be to hold samples of all the food crop varieties in case disaster strikes any of the banks—like the typhoon that wiped out the Philippines agri crop gene bank in October.

*"...the best freezer in the world ....The seeds will be safe there for decades."*

It will also ensure a pristine source of research material for the world's botanists struggling to create crop varieties that will be able to withstand the massive changes in rainfall patterns and temperature that may come with global warming.

The scientists from around the world predict that global average temperatures will rise by between 1.8 and 4.0 degrees Celsius this century due to human activities, putting millions at risk from rising sea levels, floods, famines and storms.

"Current crops are adapted to the current climate. Start changing that and you change everything," Fowler said. "Plant breeders will have to be designing totally new varieties."

"We already have a water crisis with agriculture and climate change will make it worse. It is not a simply matter of migrating crops northwards. Everything changes—sunlight, temperature, insects, diseases, pollinators," he added.

He said the Svalbard seed collection would not include modern hybrid varieties because by and large they had genetic diversity bred out of them.

But it would also not rule out genetically modified organisms on the simple grounds that it would be virtually impossible to screen them out and in any case they would never amount to more than a tiny fraction of the total.

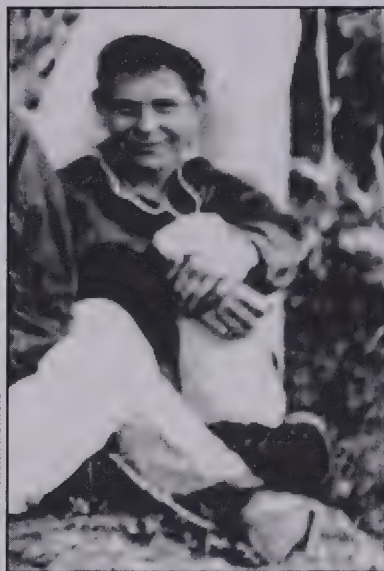
The vaults on the remote archipelago 1,500 kilometers north of the Arctic Circle should have been dug and lined with meter-thick concrete by October ready for systems installation and a formal opening early in 2008.

Within two years they should be holding the vast majority of the world's food crop varieties in splendid, frozen and permanent isolation. □



# Able Seaman George Winstone

by Glenn M. Stein, FRGS



SCOTT POLAR RESEARCH INSTITUTE

In the decade leading up to the first International Polar Year (1882-83), two British expeditions made major contributions to polar geography and science. The first was the 1872-76 *Challenger* Expedition, a worldwide oceanographic voyage that ushered in the modern science of oceanography. The other was the 1875-76 British Arctic Expedition. Only a handful of individuals participated in both historic ventures—George Winstone was one of them.

When the three-masted corvette *Challenger* put to sea from Portsmouth on Dec. 21, 1872, the 17-year-old Gloucester County youth formed part of her crew. Equipped with auxiliary steam power, the *Challenger* had been converted into a floating laboratory. Over the next four years, Winstone's grey eyes would see an astounding variety of plants, creatures and formations in the natural world. Among these were icebergs in both the Arctic and Antarctic, captured in rare early images by the camera's eye.

During the course of the expedition, many uncharted harbors and coastlines were surveyed, including the subantarctic island of Îles Kerguelen, in the southern reaches of the Indian Ocean. In January 1874, an observation station was set up on Kerguelen for tracking the transit of Venus later that year. This was *Challenger*'s main reason for visiting the island. On Feb. 16, 1874, ten days after leaving Îles Kerguelen, *Challenger* became the first steamship in history to cross the Antarctic Circle. But the enchanting beauty of the southern polar regions, with its glimmering floating ice palaces, was soon masked by a gale and snowstorm. The ship took shelter under the lee of a huge iceberg and, in the process, a circular current flung *Challenger* headlong into the ice, carrying away her jib boom. A narrow shave, but she survived.

After leaving Antarctic waters, the ship made its way to Melbourne and eventually found herself in Hong Kong by year's end. It was at this Far Eastern British colony that the commander, Capt. George S. Nares, another officer and a few sailors, parted company with the expedition. All returned to England to prepare for the Arc-

tic expedition, with Nares in command of a two-ship squadron, *Alert* and *Discovery*. A new commander of *Challenger* saw the expedition through its conclusion on 24 May 1876, when the ship arrived at Spithead. The ship and crew had logged 127,634 kilometres (68,890 nautical miles) and spent 719 days at sea. Along with daily magnetic observations from around the world and establishing 362 observation stations, thousands of new species of marine life were added to science. (To read a related article on the *Challenger* Expedition by this Author, go to [www.19thcenturyscience.org/HMSC/Chall-Medal/ChallengerMedal.html](http://www.19thcenturyscience.org/HMSC/Chall-Medal/ChallengerMedal.html).)



NATIONAL MARITIME MUSEUM, GREENWICH

HMS *Alert* at Winter Quarters, Spring 1876 (detail)

Winstone had the distinction of being the youngest member of the new Arctic Expedition. In the midst of his time aboard his previous ship, he was promoted to Ordinary Seaman and, by March 1875, was rated an Able Seaman on the *Alert*. He came to have a leading part in the expedition's primary objective—an attempt to reach the North Pole. Other geographical aims were to trace the coasts of Ellesmere Land (later determined to be an island) and Greenland, to determine the distance land extended to the north. In the fall of 1875, the *Discovery* established winter quarters at the north end of Kennedy Channel, in a place now known as Discovery Harbor (near the north shore of Lady Franklin Bay). *Alert* went further up the Ellesmere coast to make her quarters on the northeastern corner, at Floeberg Beach.

In spring of the following year, sledge parties departed from both ships. One party from the *Discovery* surveyed a deep fjord to the south, now called Archer Fjord, after the officer commanding the party. The Greenland Sledge Party also set off from the ship. Meanwhile, the Ellesmere Sledge Party made its way along the northern coastline from the *Alert*, and the Northern Sledge Party proceeded on its journey over the frozen sea. The men of the last named not only dragged sledges but also two sledge-mounted boats, in case leads of water were encountered on the march.

The journey north was agonizing, and one boat was abandoned on the way. In their 72 days away from the *Alert*, the party encountered massive pressure ridges and shifting ice. Progress was very slow, and the men were attacked by scurvy. By the time a furthest-north record was achieved on May 12 (latitude 83° 20' 26" N), it was going to be a fight for survival back to the ship. One by one, crippled sledgers fell out of the drag ropes and some were so bad off they had to be put on sledges. The other boat was eventually abandoned. The sledge journal for Tuesday, June 6, reads in part: "Winstone will scarcely last the day and is of very little use on the drag ropes; but he perseveres bravely."; and the next day: "Winstone is unable any longer to work on the drag ropes, and has to join our trail of 'hobblers' in rear of



the sledges.” . . . “We are pulling 220 lbs. per man, and, as the snow is very deep, we find it hard work.” The strongest man of the party volunteered to make a dash for help, nearly 40 miles to the *Alert*—it was their only chance of getting back alive.

On June 8, Royal Marine Artilleryman George Porter died and was buried on the ice floe; his comrades had dragged him on a sledge for seven weeks, hoping to save his life. The next day, an advance rescue party arrived from the ship. Out of the Northern Sledge Party’s original 15 men, only three were capable of dragging a sledge. In view of their condition, Nares sent out relief for the Ellesmere Sledge Party; as it turned out, it too was ravaged by scurvy, with only its officer fit to pull the ropes. Sledgers from the *Discovery* were facing similar agonies and had to be rescued. By June 1876, four sledgers had lost their lives to disease and the elements, and scurvy was eating away at many of their shipmates. Though he was expected to stay in the Arctic until 1877, Captain Nares realized his people could not survive another winter, and he prepared to head for home. He left behind the bodies of four men as testimony to the sacrifices of the expedition’s personnel.

Because the press oversold the entire venture to the public (particularly the unrealistic goal of reaching the North Pole), people lost sight of the expedition’s geographical and scientific accomplishments: Three hundred miles of new coastline was discovered, as well

as a large section of the Arctic region; attainment of the highest latitude ever reached by man; discovery of a fossil forest at 82° north latitude; and observations of mammals and birds and a complete collection of flora of the most northern known region, were some of its achievements.

Individual recognition from the British government was forthcoming in the form of a specially struck, silver Arctic Medal. The obverse features the crowned and veiled bust of Queen Victoria, with the legend “VICTORIA / REGINA / 1876,” while the reverse depicts the *Alert* in winter quarters, with heavy clouds above. The medal is suspended from a plain white ribbon. It was the first time that a British medal’s design was taken directly from a photograph, and there may have been a practical reason for this choice. The *Alert* and *Discovery* did not reach England until November 1876, and the earliest despatch of the Arctic Medal was apparently April 1877. With a time factor at work, bureaucratic wheels were set in motion upon the expedition’s return, so that medals reached some recipients within six months. Every man on the expedition (or the next-of-kin of the dead) was entitled to the award. Engraved on the edge of each medal was the recipient’s name, rank/rate and ship. Winstone’s medal is now held in a private collection.

And what of young Winstone? He was only 21 years of age when the *Alert* returned home, with his exemplary conduct noted during the expedition. He then went

to the gunnery training vessel *Excellent*, on which he qualified as a diver in August 1878. But at one point on the *Excellent* his conduct dropped down to only “Fair.” The very next month, he returned to the *Alert* and was again under Nares’ command. This time, the assignment was a two-year survey expedition to the Straits of Magellan and South Pacific. But Nares was recalled after only one season to take up the post of Marine Adviser to the Board of Trade, and Capt. John Maclear, Nares’ former second-in-command aboard *Challenger*, took over the helm. In June 1880, while the ship was anchored at Coquimbo, Chile, Winstone deserted. Evidently, something changed and Winstone became disenchanted with the Navy, even though his conduct had risen to “Very Good” on his second cruise aboard the *Alert*. Perhaps a more romantic explanation might be that he was lured away by stories about the Australian gold rush and the diamond and gold mines in South Africa? His thoughts during this time are like unfilled pages of a journal. □

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Glenn “Marty” Stein provided us the George Winstone article and photos. Marty is a life member of the American Polar Society and a Fellow of the Royal Geographical Society. One of his primary objectives is to interest and educate the public in polar history, which is vital if people of today and the future are to appreciate and preserve not only human cultures and historical sites, but the vast variety of plant and animal life on this earth. Stein can be contacted at <eloasis@earthlink.net>.

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## Large Ice Shelf Detaches In Far North

### At 19 square miles, chunk could pose sea hazard next summer.

**Orange County [Calif.] Register, CALGARY, 30 December 2006, by Jeffrey Jones**—A chunk of ice that was initially bigger than the area of Manhattan broke from an ice shelf in Canada’s far north and could wreak havoc if it starts to float westward toward oil-drilling regions and shipping lanes next summer, a researcher said Friday.

Global warming could be one cause of the break of the Ayles Ice Shelf at Ellesmere Island, which occurred in the summer of 2005 but was only detected recently by satellite photos, said Luke Copland, assistant professor at the University of Ottawa’s geography department.

It was the largest such break in nearly three decades, casting an ice floe with an area of 25 square miles adrift in the Arctic Ocean, said Copland, who studies glaciers

and ice masses. Manhattan has an area of 24 square miles.

The mass is now 19 square miles in size.

“The Arctic is all frozen up for the winter and it’s stuck in the sea ice about 30 miles off the coast,” he said. “The risk is that next summer, as that sea ice melts, this large ice island can then move itself around off the coast and one potential path for it is to make its way westward toward the Beaufort Sea, and the Beaufort Sea is where there is lots of oil and gas exploration, oil rigs and shipping.”

The break went undetected when it happened due primarily to the remoteness of the northern coast of Ellesmere Island, which is only about 500 miles from the North Pole.

The speed of the crack and drift-off shocked scientists.

Satellite images showed the 9-mile long

crack, then the ice floating about 0.6 miles from the coast within about an hour, Copland said.

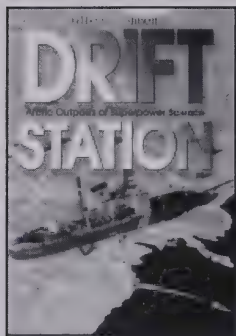
“You could stand at one edge and not see the other side, and for something that large to move that quickly is quite amazing,” he said.

Copland said the break was likely due to a combination of low accumulations of sea ice around the mass’s edges, as well as one of the Arctic’s warmest temperatures on record.

“It’s hard to tie one event to climate change, but when you look at the longer-term trend, the bigger picture, we’ve lost a lot of ice shelves on northern Ellesmere in the past century and this is that continuing,” he said. “And this is the biggest one in the last 25 years.” □



## Book Reviews



### Drift Station: Arctic Outposts of Superpower Science

by William F. Althoff

(Potomac Books, 2007, 357 pp, \$39.95)

Reviewed by Dave Norton

Before this ambitious book commanded my attention and imagination, I was indistinguishable from nearly everybody else worldwide in lacking appreciation for the largely 20th century history of research stations on ice floating to and fro on the Arctic Ocean. William Althoff tells us why and how dozens of Soviet, U.S. and Canadian floating ice stations came to be deployed, what they accomplished, and what daily life was like in some of these camps. He shares an important, all too easily overlooked, chapter in the history of science. *Drift Station* exemplifies one of the retrospective syntheses that the Fourth International Polar Year, 2007-2009, purports to encourage.

Admittedly, my background provided fragmentary knowledge of a few ice stations, such as the Soviets' 1937 North Pole-1 (also known as NP-1, or SP1 in their long series), Alpha, ARLIS, and the U.S. Fletcher's Ice Island (T-3). Althoff's synthesis weaves these fragments and others into coherent fabric, and injects some logic into the contradictory cloth of camaraderie and rivalry over decades of research at these stations.

Scholarly understatement masks some intensely entertaining drama in this chronicle. Readers can choose to absorb this account as earnest historical analysis only, or to allow their dramatic sense to savor interludes of classical comedy in Althoff's treatise.

The improbable events that led to the Soviets' first drifting ice station illustrate opportunities for the comic option. My perception of Russians' accomplishments has long been that unless they subject themselves to a thoroughly unpleasant experience, their pioneers in exploration and science seem to doubt the legitimacy of their achievements. After all, back in 1928, the Soviet icebreaker *Krassin*, supported by scouting aircraft, had already startled the world by rescuing the survivors of Umberto Nobile's dirigible expedition to the North Pole. Althoff expresses his admiration for Russian heroics without stressing their suffering. The second IPY (1932-33) voyage by the Sibiriyakov dwells on that ship's contribution to applied science, and on the resourcefulness its crew displayed, not on hardship. When that ship's propeller

was destroyed by heavy Chukchi Sea ice after 5,500 km of steaming eastward through the Northern Sea Route (a mere 160 km from its Bering Strait destination) scientists and crew undertook 6 laborious days of shifting the disabled vessel's cargo forward. The ship's stern slowly rose, until her damaged propeller and shaft emerged, whereupon engineers worked from ice to replace the broken propeller (pp. 18-19). Two days after the ship regained headway, her shaft sheared, dropping the new propeller to the seabed. Sibiriyakov's dauntless crew spread canvas to sail the powerless ship through Bering Strait.

Althoff deftly links that IPY adventure to its quintessentially Soviet-style sequel, the Chelyuskin expedition. Soviet "colonists" set off in an ice-strengthened freighter from Leningrad to traverse the same Northern Sea Route, aiming for Wrangell Island in 1933-34. This ship ran afoul of adverse ice conditions in the Chukchi Sea north of Bering Strait, just as the Sibiriyakov had. In February 1934, the Chelyuskin was crushed by ice, and foundered (p. 21), but all 104 survivors evacuated to the ice, where they set up camp. Weeks later, the last survivors were plucked from the ice by airplanes scrambled from across the USSR. *Drift Station* traces the Kremlin's logic that connected the Chelyuskin crew's relative comfort (p. 29) on the ice, their evacuation by airplane, to deliberately air-deploying scientists for measurements in the polar basin from a drifting camp in the pack ice. A pantheon of Soviet Polyarnik heroes—Dr. Otto Shmidt, Vodopyanov, Chkalov, Levanevsky, Papanin, Krenkel—participated in the centralized planning that led to deploying the first 4-person drift station, NP-1, in 1937-38. Throughout the book Althoff shares gems of insight from pioneer observers. One such gem is airman Vodopyanov's assuring the Kremlin that for aircraft landings, Arctic ice surfaces are rarely as chopped up as those he repeatedly experienced in the northern Chukchi Sea (p. 36). Six decades later, armed with far more sophisticated tools, North American observers were still reaffirming and seeking causes behind Vodopyanov's observations on ice qualities in this Chukchi flaw zone (Richter-Menge et al. 2002; Norton and Gaylord 2004).

*[William Althoff] shares an important, all too easily overlooked, chapter in the history of science.*

That first drift station under Papanin's command acted as hub to a series of accomplishments that radiated outward from its drift track, from the Pole to Scoresbysund in Greenland in 9 months (p. 60). NP-1 confirmed the accelerating drift of pack ice at the Atlantic exit end of the Transpolar Drift first documented by Fridtjof Nansen aboard *Fram* in the 1890s. Its swath of observations included bathymetric readings, meteorological observations, profiles of temperatures through the water column. These established preeminence of the Soviets' understanding of polar dynamics on the eve of World War II. Additionally, NP-1 had relayed radio traffic to transpolar flights—two successful and one unsuccessful—from Moscow to North America in June, July, and August 1937, under the commands of Chkalov, Gromov, and Levanevsky, respectively.

World War II either caused or extended a hiatus in Soviet ice station-based research after the August 1937 disappearance of Levanevsky's 4-engined aircraft and crew of five (p. 28; 293-294) and the recovery by ship of the "Papaninites" from their battered ice floe in February 1938. It puzzles me (and other authors, like John Grierson, p. 339) that the military value of Soviets' contribution of their superior grasp of polar meteorology to their wartime allies has received so little analysis or recognition.

Narrowing this gap in polar meteorology motivated early postwar U.S. Arctic efforts. Soon after war's end, U.S. military observation flights ranged daily from Ladd Air Force Base in central Alaska over the Arctic Ocean to the Pole. In August 1946, radar aboard one WB-50 detected a large ice island fragment from the Ellesmere Island ice shelf, known originally as Target X, then as T-1 and finally T-3, also as Fletcher's ice island. This fragment served as radar target, platform for postwar polar camps, auxiliary landing strip, and tracker of ice motion. Occupied from 1952-1974, its last confirmed position (1983) placed it finally in the grip of the Transpolar Drift, about to be expelled from Arctic to Atlantic through Fram Strait, 37 years after its original discovery (p. 220). Ice islands, however durable and strong, played a role in 20th century research secondary to that of stations established on floe ice by each of the superpowers; ships deliberately or involuntarily iced in accounted for the smallest effort overall (Appendix 1: 265-268). For many reasons discussed in this book, U.S. expertise lagged behind the Soviets' Arctic experience and interpretive skills, until 1970 or perhaps later.

After some preliminary short-term occupations of the ice (p. 69), the Soviets quietly resumed their series of Severnyy Polyus stations in 1950, with SP-2. By 1950, the 45-year long Cold War had divided former WWII allies. The rift meant that both superpowers recognized and strove to capitalize on the strategic importance of the North Polar Regions, initially for their linkage to temperate zone meteorology, then to air power, then to submarine warfare. Not until the doctrine of Mutually Assured Destruction with nuclear warheads had moved away from primary dependence on submarine-based mobile ICBMs, could the superpowers relax their mutual vigilance across the Arctic Basin toward the end of the Cold War.

Sustained vigilance and mistrust make it all the more remarkable that the Third IPY (IGY, of 1957-58; p. 109-152, Chapter 4) stimulated useful and constructive efforts by the U.S.S.R. and the U.S. in the Arctic. Althoff's (2000) earlier book, *Arctic Mission*, treated this interval, which included the launch of Sputnik, the IGY, the first transit of the Arctic Basin by nuclear submarine, and the (so far) final attempt to apply dirigible technology to the Arctic. In this book, Althoff deepens historical insights into the pivotal period. *Drift Station* captures intrigues of inter-service rivalries, personality clashes, and political machinations to persuade sources of funds of the urgency behind one or another mission. IGY became the era of U.S. ice stations Alpha, Bravo (T-3's designation for part of IPY) and Charlie, as well as the introduction of nuclear submarines. Citing Arctic submariners' needs for sophisticated acoustics skills, Althoff transitions into the book's fifth chapter ("ARLIS, Acoustics, AIDJEX, and SPs," p. 153).

At this transition, *Drift Station* understates one





## Near Record for Shackleton Book at Auction

by Robert Stephenson

A rare copy of *Aurora Australis*—the book produced by Shackleton's Nimrod expedition and the first book published in Antarctica—sold for a near-record price at Swann Galleries in New York City on 24 May 2007.

The star of the sale of the polar library of APS member Dr. John Levinson, the book fetched \$84,000 (all prices include Swann's 20 percent buyer's premium), just below the record for a copy of *Aurora* set in England in 2006. That copy went for £53,000—or about \$92,000.

Said George Lowry, Swann Galleries Chairman: "Dr. Levinson assembled a superb collection, and the auction results more than fulfilled expectations." The sale total was \$536,981.

Other highlights include:

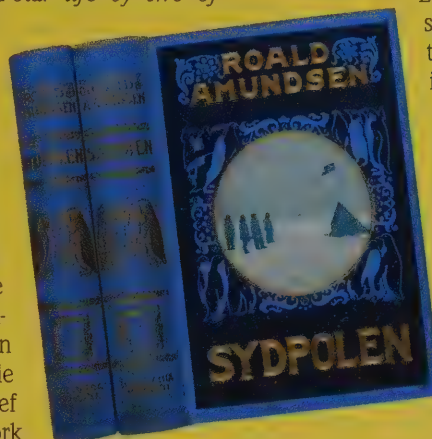
- George M. Levick's surgeon's kit, from Robert Scott's Terra Nova Expedition, was bought by a Scandinavian museum for \$6,240.
- *Sydpolen*, the first edition of Amundsen's narrative, fetched \$5,000 against an estimate

of \$800-\$1,200. Quipped auctioneer Nicholas Lowry: "March of the Penguins right to the bank."

• James Murray and George Marston's 1913 book *Antarctic Days, Sketches of the homely side of Polar life by two of Shackleton's*

*men*, first edition, deluxe issue, signed by Shackleton, Murray and Marston, set a new record of \$14,400.

• A message buoy used on the 1901-02 Baldwin-Ziegler Expedition to the North Pole via Franz Josef Land, with a cork base and a 45-star metal American flag, brought \$8,400 from a private collector. This type of buoy was used by Arctic explorers to communicate with the outside world. The wire metal top unscrews to reveal a hollowed out area in which messages could be placed before the buoy was tossed overboard or left at a designated place for another ship to pick up. This one was found at Bass Rock at a latitude of 76°N in Northeast Greenland, by L. P. Bendiksen, and later given to the Geographical Society of Philadelphia. While the Baldwin-Ziegler Expedition led by Evelyn Briggs Baldwin, Carl Johansen and Johan Kjedsen set up winter quarters and even began depositing supplies along a route to the Pole, no attempt was ever made.



Five lots of artifacts connected with the historic huts of Antarctica, the majority of them acquired by gift from passengers on tourist voyages, were withdrawn by Dr. Levinson, who is donating them to the Antarctic Heritage Trust. □

**ABOVE LEFT:** This rare relic, a 20-inch high message buoy used on the 1901-02 Baldwin-Ziegler Expedition to the North Pole, sold for \$8,400.

**ABOVE:** Of *Sydpolen*, which fetched \$5,000, auctioneer Nicholas Lowry quipped: "March of the Penguins right to the bank."

especially entertaining Cold War tribute ("Cold-feet") conferred by U.S. observers on their Soviet rivals. The secret visit in mid 1962 to SP-8 by two U.S. observers dropped by parachute on the recently abandoned Soviet floe station bespoke considerable respect. How sound was the science of these Soviet rivals? After a few days of snooping to find out, the two observers were plucked from the station by a modified B-17 bomber equipped with the Fulton "Skyhook," designed to retrieve spies from surfaces where landing is impossible (p. 149).

This book's scholarly breadth overwhelms its few shortcomings. The publisher's budget appears to have ruled out crisp reproduction of the book's photographic images, many of which seem to have suffered in conversion from color to black and white. A few bibliographic citations missed part of a title or location of publication (e.g., Arctic Institute of North America published one source in Calgary, Alberta and Fairbanks, Alaska, not in Winnipeg, Manitoba—p. 316, note 8) that could trouble someone searching archives. The tyranny of modern spell-checkers may be to blame for certain proofreading oversights, such as "climactic" for "climatic" (p. 153, 199, 254); "Alex" for "Axel" Heiberg Island (p. 190). Point Barrow's latitude is 71°N, not 75°N that is indicated (p. 74) but these sticklers' quibbles are not substantive criticisms.

In organizing the welter of facts scattered among so many varied sources (p. 337-348) Drift Station un-

dertakes a daunting task, and largely succeeds. This review emphasizes early chapters, but other readers may be drawn to Althoff's post-IGY chapters on ice islands, ice floe stations, frozen-in drifting ships, and rapidly deployed and recovered crews taking spot-samples. Drift Station appears to present a balanced, reasonably complete, record of the AIDJEX, SCICEX, latter SPs, Canada's Ice Island and SHEBA experiences. Since the 1980s, international cooperation and replacing acoustics research with environmental concerns and global change studies have characterized the continually evolving basis for interest in Arctic Basin processes. Upon the Fifth IPY, our progeny should re-read Althoff's Epilogue (p. 255-264) to judge the durability of his current outlook on the future of ice-based research in the Arctic. □

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### Footsteps On The Ice: The Antarctic Diaries of Stuart D. Paine, Second Byrd Expedition

Edited by M.L. Paine  
(University of Missouri Press, 2007,  
368 pp, \$34.95)

Reviewed by Cliff Bekkedahl

What a guy! A guy's guy! Who do you want covering your Six? Stuart Paine, that's who! Picture this: It's August 1933, the country is gripped in the worst depression in history, you have a job as an ad copy writer, you hunker down and



hang on to the job. Right? Wait—the boss sez you have to wear a coat and tie, never mind how hot it is in your tiny office. You're 22 years old, single and restless—hey, take this job and shove it!

Perhaps the departure was a little more genteel but Stuart Paine thought he had options. He had an opportunity for a quartermaster position aboard a merchant ship, Pacific Fir, but that cratered, and he soon found himself in Wonalancet, N.H., in the "Dog Department," working for Captain Alan Innes-Taylor who was gathering dogs for the second Byrd Expedition. An offer to join the expedition was extended, and Stuart Paine now found himself slated to be a dog driver, navigator and radio operator. His qualifications? An ROTC college course in celestial navigation, the rest still to be attained on-the-job.

Fortunately for all, including the readers of this lucid account, Stuart Paine turned out to be a solid performer—quick to learn, unafraid of hard work or physical challenge and, above all, committed to fulfilling his duties and responsibilities. A happy camper throughout?

No, but then who was or is, in any of these wintering-over experiences, even to this day? You would have to search long and hard through the literature to find someone unfazed by the dark months and bitter cold of Antarctic winters. Stuart Paine endured, as so many have, and what makes his account especially unique is his concise and lucid writing, a skill no doubt inherited to some degree from his father, who was a professional writer.

He is easy to read and, as his diary entries draw you along, you're liable to forget that so many of the entries were written with a stub of a pencil in a gale-blown tent with temperatures almost continually dropping into the range of -20 to -70°F.

Stuart's account, expertly footnoted by his editing daughter, begins with the confusing period of preparation in New York which, in his case, involved receiving the expedition's complement of dogs, all wild and wooly and spoiling to fight. The dogs had to be caged, fed, exercised and treated for injuries and sickness, and, in his diary, Paine leaves little to be imagined of the problems—canine and human—he encountered while caring for his new friends. The trip south through the Panama Canal and across the Pacific to New Zealand revealed a great deal about his shipmates, their skills and trustworthiness.

Leaving New Zealand southbound was the beginning of the real adventure, and while Paine describes the building and fitting out of Little America II, he also finds himself at odds with his contemporaries and at times is fearful that he won't be selected for one of the expeditionary forays schedule to be conducted when winter breaks in October of 1934. He also expresses his concern in his diary as to the leadership of the expedition and, specifically, Admiral Byrd's decision to winter over alone at Bolling Advance Base. Paine and others, then and subsequently, have questioned this decision—was it simply a stunt, a publicity gimmick? How wise was it for the expedition leader to isolate himself and direct that no effort be made to initiate a rescue effort, should something go awry? As it was, Byrd nearly died from carbon monoxide poisoning, and a rescue mission, thinly disguised as an early exploratory probe for the season, was conducted, retrieving the weak and disorient Byrd.

Tending to the dogs over the long, dark austral winter of 1934 was not an easy task, and often Paine found himself to be the only member of the dog department, feeding, cleaning cages and caring for the

ill and injured animals. His workmates were often AWOL—some drunk, others in their bunks or lounging in the mess hall in that don't-give-a damn mood that the dark, damp and cold of Antarctic winter can impose on people.

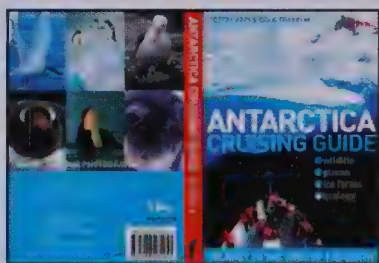
Paine's qualifications, honed by winter study of radio operation and repair and dogsled journeys establishing supply caches for the next spring's ventures, were recognized, and he was chosen to be one of a three-man foray for geological study in the vicinity of the Queen Maud mountain range. This would be the longest journey scheduled and, indeed, Paine and his compatriots, by ski and dogsled, traveled a record 1410 miles in 88 days, penetrating south to latitude 87 degrees. Reading this account, it is clear that this journey was a defining experience in his life. It is a gripping and wonderfully worded record of one of the major accomplishments of the Second Byrd expedition.

Upon leaving the Ice, Paine remained a steadfast diarist and recorded all the hullabaloo of the triumphant return of the expeditionary group to New York.

His diaries consisted of three leather-bound notebooks that languished in the family bookshelf until his daughter Marilyn recognized their importance and set about preparing them for publication. His penmanship is clear, and samples of entries, along with photographs in camp and on the trail, are artfully displayed in this splendid and lovingly crafted book. The appendices alone make for interesting reading and include a short article by Dr. Thomas C. Poulter, chief scientist on the Second Byrd expedition, as well as eight issues of *Barrier Bull*, the Little America II newspaper created by Stuart Paine and Dick Russell.

This book belongs in your library. It is a first-hand, unvarnished account of the Second Byrd expedition from the perspective of an observant and steadfast working member of the expedition and stands shoulder to shoulder with other participants' books in what was probably the last of the "exploratory" expeditions to the southern continent.

Meryl Paine deserves a rousing "Well done!" for this splendid book, an invaluable addition to the historical record of the Byrd era of Antarctic exploration. □



## Antarctica Cruising Guide

by Peter Carey and Craig Franklin  
(Awa Press, 2006, 233 pp, NZ\$39.99)

Reviewed by Richard Wolak

This useful book for the greatly expanded Antarctic tourism market likely answers the most common shipboard questions from the largest number of Antarctic cruise participants. However, it is not for the early planner, being an onboard guide for the expedition who has already gotten beyond such questions as when to go, what company, what size ship, what clothes to bring, what background reading, or what to

see and do at his point of embarkation. Rather, the book is an ad hoc guide for the actual experience of cruising the Antarctic Peninsula: a "primer... and a handy reference" to wildlife and places likely to be encountered.

The authors are both Ph.D.-level zoologists with extensive experience both in national research programs in Antarctica (those of New Zealand and Australia), and as expedition staff aboard a significant number of cruise vessels. In addition to serving travelers' needs for relevant information, the book is clearly intended as a means for the authors to express their strongly-felt views on Antarctic wildlife conservation and ecosystem protection. The book's introductory section provides good background information on Antarctica, its physical characteristics, extremes of climate and ice, and the international politics that have evolved there. While there is little commentary on the history of Antarctic exploration, sufficient reference is included in later site descriptions to connect an area or its artifacts to relevant historic activity and explorers of note.

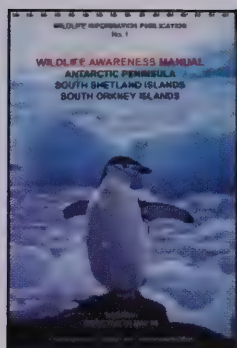
Five maps are easily accessible just inside the front cover. Although the maps are fairly small scale, they provide full coverage for locating one's position relative to all of Antarctica, and the location of all described landing sites in relation to the Antarctic Peninsula. The Guide describes 26 such locations around the Peninsula, all of them among the favorite destinations of Expedition Leaders. They are each clearly marked on at least one of the maps.

The section on Antarctic life forms starts with a well-done overview of both marine and terrestrial ecosystems. Following that are discussions of group characteristics for each wildlife category, followed by pictures and more specific data on each species. Throughout these sections, the authors provide highlighted "take-home points" to emphasize the most important items presented. As with the locations that were selected for inclusion, the information on Antarctic birds and mammals does not stray far from wildlife that will likely be seen on a mainstream "Classic Antarctica" form of Peninsula cruise. Species covered include 16 sea birds, 5 penguins, 6 seals and 4 whales (Emperor Penguins, Ross Seals and Blue Whales are not so likely to be seen, but their inclusion is certainly important for completeness.)

As scientists, the authors have endeavored to include only data that is well supported by peer-reviewed scientific journals and texts, eschewing commonly repeated anecdotes that are not well documented. Considering that, I was a bit surprised that the "Facts And Figures" page shows the continent's area as 11.9 million sq km, as I'm more accustomed to seeing this figure in the range of 14 million sq km. Reading further, it appeared that the 11.9 million did not include the fast ice that is commonly part of the larger figure. The area of "fast ice" is not included in their list, but "sea ice in summer" is shown as 4 million sq km. (I'm not sure of the correlation between "sea ice in summer" and "fast ice".)

Overall, the writing is clear with sufficient background information provided so that the more complex concepts make sense. Words that would be considered scientific terminology or local jargon are explained and/or included in a Glossary of about 60 entries. In my experience, the book contains the quantity and level of information that most every traveler to the Antarctic Peninsula would like (or need) for an adequate understanding of Antarctica and to enhance appreciation of their immediate surroundings. □



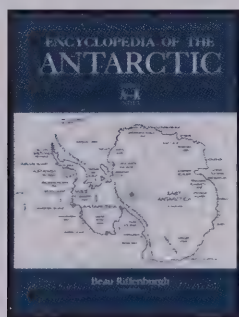


## Wildlife Awareness Manual: Antarctic Peninsula, South Shetland Islands, South Orkney Islands

Edited by C.M. Harris  
(Environmental Research and Assessment,  
2006, 136 pp, £15)

Reviewed by John Spletstoesser

This illustrated publication was prepared for the UK Foreign & Commonwealth Office and HMS *Endurance*, with an aim to provide practical information on breeding wildlife (penguins, petrels, shags, fulmars, fur seals) colony locations. Information on scientific stations, protected areas and historic sites is also included. The manual is designed primarily to meet the needs of helicopter pilots, with colored orientation maps, photographs and supplementary information highlighting key wildlife and landing site information. It is labeled as 'Wildlife Information Publication No. 1, 1st Edition,' implying that succeeding editions will follow as information changes. □



## Encyclopedia of the Antarctic

Edited by Beau Riffenburgh  
(Routledge, 2007, 2 vols., 1233 pp, \$425)

Reviewed by John Spletstoesser

**E**ncyclopedia of the Antarctic might sound like a repeat of another book on the subject, and in some respects it is. Within the last few years, there have been comparable titles of comprehensive entries of subjects that the editor(s) have found to be vital for a complete overview of this remote part of the world. The question is whether another is needed.

In this case, Beau Riffenburgh, former editor of *Polar Record*, states in his introduction, the goal was to "produce a comprehensive, multi-volume work that would cover the entire scope of Antarctic knowledge." He has certainly come close to it, including in the entries many that I would not have thought of.

His efforts in putting this together has produced 495 free-standing, alphabetically ordered entries of 500 to 6,000 words in length, authored by 319 contributors. All are well-known specialists in their field, but the book has also benefited from the advice of an Advisory Board of 13 individuals.

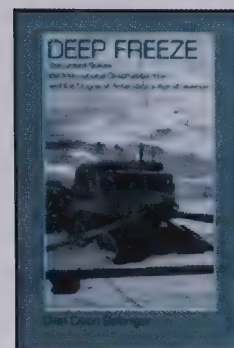
The book is divided into convenient and easy-to-locate segments, with the List of Entries A-Z in each volume, followed by a Thematic List of Entries, which includes the Entries in 15 major headings (Birds, Geography, Geology, Glaciology, Marine Mammals, Sea Ice, for example), making it easier to look for entries under those subjects. Two maps follow, one of the Antarctic continent, the other of the Antarctic Peninsula.

Cross-references are found at the end of nearly each entry, and each also includes a list of references and further reading. Seven appendices, including the text of the Antarctic Treaty, and 16 maps provide further guides to the reader.

There is little space in this review to delve into specific entries, except to say that the degree of coverage is thorough and about as complete as the contributors can provide. Regarding specific entries, I have a minor criticism when trying to locate one for oil, gas, hydrocarbons, or whatever might provide the proper term(s). The Index is the key, where each of those terms led me to the appropriate location in the book—"Coal, Oil, and Gas"—which covered all that was necessary to say in 1-1/2 pages, including references, although a more complete treatment would have been preferred. In another entry, one of my other interests, "Aviation, History of," covered very useful information in seven pages of text. My field work in Antarctica in the Ellsworth Mountains, led me to the entry for "Ellsworth, Lincoln," which I found to be very thorough given space limitations.

Aside from that, considering the lengthy list of 319 contributors, I attempted to locate individual entries by a number of my colleagues, and found that to be impossible. (Author names are not in the index.) A few minor errors were noted in a scan of the many entries, none of which is serious, although the hard cover binding caught my eye when I noticed that the map of Antarctica on each of the volume covers includes two errors—Berkner Land should be Berkner Island; and the Russian station Novolazarevskaya is misspelled, at least according to my transliteration of the name.

Overall, the purpose of the *Encyclopedia* has been served, as stated by the editor. The depth of coverage is very impressive and thorough. It is recommended for virtually all libraries that have polar interests and collections, although the price might drive some individuals away from an addition to a personal library. □



## Deep Freeze: The United States, the International Geophysical Year and the Origins of Antarctica's Age of Science

by Dian Olson Belanger  
(University Press of Colorado, 2006,  
494 pp, \$29.95)

Reviewed by Cliff Bekkedahl

If a reviewer were only allowed one word to describe this book, it would have to be "Definitive," accompanied by a whole string of exclamation points. Dian Belanger has captured and, as an author, now owns those seminal years of 1955 through 1958 of the Navy's "Operation Deep Freeze" and the launch of the International Geophysical Year.

This book is a detailed, often day-by-day, account of the people—uniformed and civilian—who planned and executed the beginning of this country's role in the international and systematic scientific exploration and study of the vast frozen continent of Antarctica. Henceforth, every book or scholarly paper addressing this period of mankind's engagement in the southern continent will include *Deep Freeze* in its bibliography.

*Deep Freeze* can be read on three levels. The first is as a great yarn about the people and things that found their way to some strange and remote places. If you were there at the beginning, then look for your name or the name of shipmates or bunkmates who made it happen... the establishment of multiple wintering-over encampments in a breathtaking race against the clock and the unforgiving Antarctic winter.

Second, the author has traced the sequential events in the context of the overarching objectives of the IGY and the planning priorities that began with the now-famous dinner at the home of James Van Allen, the birthplace of the post-World War II IGY. So much was accomplished in such a short period of time by so many often-inexperienced but totally dedicated people. Operation Deep Freeze was a logistical nightmare turned to a miracle by the "can-do" spirit of the Navy's Seabees, and this spirit permeated all elements of the Force—including Navy ships and aircraft, units of the U.S. Air Force and the civilian scientists who rolled up their sleeves and pitched in to beat the clock ticking down to the Austral winter of 1956 and again in 1957.

And third, the author carefully and candidly portrays the leadership issues involved in the uneasy relations between the scientific community and the military organization headed by Rear Admiral George



Dufek. There were agendas in play, as anyone would know who has had experience dealing with large organizations. Weather, equipment failures, personalities and an almost daily requirement to improvise kept stress levels high and demanded instant and irrevocable decisions on a daily basis.

On all three levels, Dian Belanger has established the highest credentials as a research professional. Her interviews are perceptive, her facts and figures accurate and to the point and, throughout, she keeps the reader locked in the challenging environment that her sources encountered. If you were there, she takes you back; if Deep Freeze was before your time, then she takes you there and makes you understand how it all began. You can't ask more of an author, and Dian Belanger has delivered this and then some.

This book will be a reference and definitive authority long into the future. As a *Polar Times* reader, this book belongs in your collection. □



## Encyclopedia of Exploration, Part 3: 1850 to 1940 (Oceans, Islands and Polar Regions)

By Raymond John Howgego  
(Hordern House, 2006, 724 pp, A\$245)

Reviewed by Robert B. Stephenson

When you see this volume for the first time (or either of the other two earlier volumes) two things will be immediately apparent: This is a beautifully produced book, crisply designed and printed, well and strongly bound, and a joy to read, either for the occasional dipping-into or for more in-depth reference. Your other reaction is likely to be one of wonderment—how could such a lengthy and wide-ranging treatment result from the efforts of one person and not a raft of editors and contributors?

Indeed, the author Raymond John Howgego—who is described on the dust jacket as “an independent researcher, scholar and traveller...”—did it all and is now hard at work on the fourth and final volume which will focus on the “temperate continental mainlands.”

There have been several polar or Antarctic encyclopedias issued in recent years (see my exhaustive treatment of these at [www.antarctic-circle.org](http://www.antarctic-circle.org)) but the *Encyclopedia of Exploration* stands out in several ways. As mentioned, the book's design and production are superb. The entries are more detailed and run longer than those in any other work (longer still when you consider the lack of any illustrations, the large page size and the small yet readable text). The wordiest entry of all, not surprisingly, is that of Captain Scott, a full 19

pages; Shackleton is runner-up at 16. The average is around 2-1/2 pages.

The writing is more literary than that found in other polar encyclopedias: the entries are often captivating but never dry, and in perusing the book I find myself getting sidetracked and learning about things totally non-polar. And even with the polar entries, I continually come upon little-known facts. Who knew that Richard Byrd “had come face to face with bandits in the Philippines”? There's humor here, too: Nearly a page is devoted to Walter E. Traprock, a totally fictional character who led the “celebrated Traprock Polar Exploration” and in retirement was a prune farmer in Over Derby-on-the-Housatonic! The focus of the encyclopedia is clearly historical-biographical, and science in any hard sense is not to be found. This is precisely what I want given my interests; but the scientist might be better served by one of the other titles, particularly Riffenburgh's *Encyclopedia of the Antarctic*.

The subtitle of this volume is *The Oceans, Islands and Polar Regions*, so there is a lot here that the polar enthusiast might find superfluous (Hawaii is an example). If we include volume 2 of the series (*Encyclopedia of Exploration 1800 to 1850*)—which was issued in 2004, includes many Arctic and Antarctic entries and really should be on your shelf as well—there are a total of 1,374 pages of which the equivalent of about 150 are devoted to the Antarctic and 200 to the Arctic. In other words, about a quarter of the two volumes is devoted to the polar regions.

Howgego organizes his encyclopedia alphabetically by explorers not expeditions with the occasional entry for islands. He terms the entries as “major entries”—there are 66 of Arctic-Antarctic interest—but this doesn't mean that there aren't many more persons receiving attention. Tom Crean, for instance, doesn't have his own entry but rates about a third of a page in Scott's entry. Most of the entries stand alone, but in the instance where an explorer has been on several expeditions, each one is often treated separately, one after another. Shackleton rates six: The Nimrod expedition (Discovery appears in one of Scott's entries); the Endurance expedition; the Endurance expedition-Ross Sea Party; the Endurance expedition-notes on the participants; travels in South America, Svalbard and Russia; and the Quest expedition.

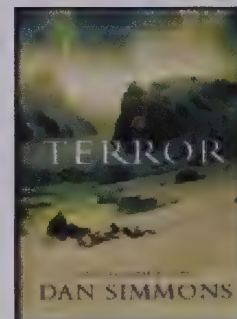
What other features distinguish the encyclopedia? There's an Index of Persons which stretches for 13 pages; an Index of Regional, Island and General Articles; and an Index of Ships, Boats, Aeroplanes and Airships (six pages). Each entry closes with an often very extensive bibliography which at times is divided into primary and secondary sources, biographies and general works.

What are some of the encyclopedia's failings? I haven't come upon anything major. There could be a map or two and perhaps some illustrations, specifically portraits as the entries are almost exclusively people. But stretching to 724 pages as it does, such inclusions might make it unwieldy—it weighs in at nearly five pounds! There is no electronic version or accompanying CD/DVD, which is too bad; perhaps these will come later. I've looked carefully but can find no details on the paper: one hopes it is acid free.

A word about the price: At 245 Australian dollars this fine book will cost you about US\$200. Given the breadth, quantity and quality of the content, that's reasonable—and less than half the price of Riffenburgh's *Encyclopedia of the Antarctic*. On

the other hand, if you were to purchase both volume two and three, you'd be paying just about that amount.

Those who would like more information should consult the publisher's website which is really very good and should be a model for all publishers: [www.hordern.com/publications/explorers.htm](http://www.hordern.com/publications/explorers.htm). It lists all the entries in the entire *Encyclopedia*—and also lets you order one sample entry of your choice, which will be e-mailed to you free. □



## The Terror: A Novel

by Dan Simmons  
(Little Brown, 2007, 784 pp, \$25.99)



## Captain Francis Crozier: Last Man Standing?

by Michael Smith  
(Collins Press, 2006, 242 pp, \$38.95)

Reviewed by Charles H. Lagerbom

Long-overlooked polar hero Francis Rawdon Moira Crozier finally gets his due as the subject of a biography and the hero of a horror novel. Both books are eminently readable and highly recommended.

Michael Smith's *Crozier* is a topnotch biography along the lines of his other book on overlooked polar hero Tom Crean. Crozier does justice to this major figure of 19th-century polar exploration, who never quite received the acclaim his peers did. Crozier voyaged with Perry, Ross and Franklin and saw much of both polar regions, spending several winters in the ice. He was second-in-command of the British expedition under James Clark Ross that got closest to the Antarctic continent, in the process discovering McMurdo Sound and Island, the Ross Sea and the impassable Ice Barrier later renamed the Ross Ice Shelf. Crozier's name went only to a lonely cape on Ross Island's eastern end, the site of a major emperor penguin rookery and the objective of Apsley Cherry Garrard's horrific



quest seventy years later in *The Worst Journey in the World*.

The problem with a Crozier biography—by no means any fault of this author—is that there is a scarcity of Crozier-centered material from which to flesh out the subject. Throughout the book, Crozier himself remains peripheral and only seems to be identifiable in context by information about the times and his voyages. For instance, the Antarctic expedition with Ross is well-covered, but the information is mostly about the voyage and not particularly about Crozier himself, although he was no doubt there and no doubt influenced events. Smith makes the most of what there is. Particular attention is paid to Crozier's relationship with Ross as well as to his failure to win the hand of Franklin's niece Sophy Cracroft. Most interestingly, the author explores the possibility of Crozier's Irish background as a primary reason for his slow advancement through the ranks of the Royal Navy. What emerges is a readable and competent biography about an enigmatic explorer that will make an excellent addition to any polar library.

Crozier fares somewhat better, although in a fictional sense, with Simmons' novel regarding Franklin's last expedition. Simmons is not confined by history, since the only final records of this tragic expedition were a hastily scrawled note around the margins of a letter stuffed into a stone cairn on a windswept remote point on King William Island. That, and the few relics and habitation sites, as well as the graves on Beechey Island, mark the final stages of Franklin's last quest to force through the Northwest Passage. This paucity of material allows Simmons the literary license to come up with his own heroes, villains and

## Boy Finds Watch Buried In North Pole

**Associated Press, COPENHAGEN, 29 March 2007**—A wristwatch buried in the ice at the North Pole three years ago was found by a boy more than 1,800 miles away after it floated ashore on the Faeroe Islands.

Niels Jakup Mortensen, 11, spotted a black box near his home on Suduroy, the Faeroes' southernmost island, his mother Anna Jacobsen said. Inside, she said, was a watch that had been buried at the North Pole by Joergen Amundsen, a descendant of Norwegian polar explorer Roald Amundsen.

Jacobsen said the watch discovered by her son earlier this month was still working and was accompanied by a letter from Joergen Amundsen.

"It was so unbelievable," she said. "It had been buried in the North Pole."

Hjalmar Hatun, an oceanographer with the Faeroese Fisheries Laboratory, said the watch likely drifted south with one of the chunks of ice that frequently break away at the North Pole and are carried off by ocean currents.

The Faeroes, an 18-island Danish territory, are located halfway between Scotland and Iceland.

Hatun said the ice breaking off is not related to global warming, as the phenomenon was first observed more than 100 years ago. "So in that sense, the fact that objects from the North Pole can drift south is old news," he said. □

theories regarding the expedition's end.

The book begins with the Franklin ships *Erebus* and *Terror* trapped in the ice twenty-some miles from King William Land (they are not yet sure whether it is an island or not). Franklin is dead and Crozier is in command. Food is running scarce (mostly due to deadly tainted canned goods), scurvy is rampant, hope that the ships will break free from the ice seems forlorn and the men struggle with their third oncoming winter in the ice. As if that is not bad enough, there is something malevolent out on the ice constantly trying to get at them, a predator they appropriately nickname "the Terror."

Along with a mute Inuit girl whose tongue has

been bitten off, Crozier and the men abandon the ships and start making their way down to the south that may, or may not, lead to their salvation. Simmons does a good job of explaining how, why and where some expedition members end up, staying mostly true to the actual remains recovered by later searchers. He explores the causes and events of the march as it becomes hopeless for some, cathartic for others and a descent into mutiny, madness and cannibalism for a few. Simmons' attention to Inuit culture as well as to mid-19th century Royal Navy life provide detailed and interesting scenarios of "what might have happened" during those final days for those desperate men. □

## OBITUARIES

### Sir Wally Herbert

by Robert K. Headland

Sir Walter William "Wally" Herbert, one of the last explorers of the polar regions who was able to make major contributions to geographical discovery and research, died on 12 June 2007. He was 72.

From a family background of travel, and an early education in Africa, he developed a persistent passion for the polar regions. In 1955 he obtained a post in the Antarctic with the Falkland Islands Dependencies Survey (which became the British Antarctic Survey in 1961). He was first based at Hope Bay, and remained south for three summers and two winters consecutively. The majority of his work involved surveying and glaciological studies. He made extensive traverses—often by dog sledge—covering some 5,000 km. His longest journey was along the mountainous spine of the Antarctic Peninsula from Hope Bay (62°23' S) to the small hut at Portal Point (64°33' S), with transits of the notoriously narrow 'Catwalk' and the 'Waist' where the Herbert Plateau narrows abruptly.

In 1960 he participated in a private expedition which went first to Lapland and subsequently to Svalbard where, it is reported, he felt the need to do something original. On his return, because of his experience with dog sledging, he was appointed to the New Zealand Antarctic Programme where his first commission was to go to the west coast of Greenland to purchase sledge dogs for the Antarctic. During this period he learnt much of the Eskimo methods of dog driving, and developed an enduring interest in their traditions and way of life. He continued to the Antarctic to join the New Zealanders with his selected team of 13 husky dogs.

As leader of the 1961-62 southern exploration party that summer he surveyed a large area of the Queen Maud Range where he ascended the Beardmore Glacier. Despite his strong desire, a request to continue to the South Pole was not sanctioned, thus his programme was exploration of new territory southwards along the Transantarctics. At the head of the Axel Heiberg Glacier his party ascended 4070-m Mount Nansen (in what was later named the Herbert Range) and descended by a similar route to that taken by Roald Amundsen in 1911, during which he found one of Amundsen's survey cairns. The Queen decorated him with the Polar Medal for his Antarctic work.

In 1966-67 he returned to Greenland to gain more experience in driving dogs over pack ice. With two companions, he lived with the Eskimo during the 1966-67 winter in the far north-west. The following spring he set out with three dog teams and four Eskimo to trace the routes described by Otto Sverdrup and Frederick Cook. This led from Greenland to Ellesmere Island and proved a difficult test for men and equipment. The 2250 km journey by dog sledge was largely across the pack-ice.

Wally's longest, and best-known, polar journey was as leader of the British Trans-Arctic Expedition (1968-69) when he was accompanied by Allan Gill, Roy Koerner and Kenneth Hedges. Their equipment included four sledges and 40 dogs. The journey began from Point Barrow, Alaska, on 21 February 1968. The geographic North Pole was attained on 6 April 1969 (the same date as Robert Peary purported to have reached it in 1909). Wally and his team were the first men indubitably to have reached this point over the ice surface.

From the pole, over difficult ice, they continued to Vesle Tåvløya, the most northerly island of the Svalbard archipelago, which was reached by two of them on 29 May 1969, 464 days from Barrow, some 6700 km over the pack-ice. From there the expedition was subsequently relieved by helicopter from HMS *Endurance*. For this

achievement—the first surface traverse of the Arctic—Wally was awarded an Arctic bar to his Polar Medal.

On Christmas Eve, six months after his return, he married Marie McGaughey. Within two years they were living, with their baby daughter, Kari, on an island off North-west Greenland making a film about the Eskimo hunters, the 'Ultima Thule' expedition (1971-73).

In later years he established himself as an artist and lectured extensively aboard passenger ships sailing in the high Arctic. He reached the North Pole in unaccustomed luxury a third time in 1991 (he had also previously arrived by aircraft) aboard *Sovetskiy Soyuz* at a critical period in Russian history. I was also on the voyage and observed with him the vast difference when on one side of the icebreaker there was an uproarious revelry on the floes while on the other side the tranquillity of the central Arctic was apparent around a circular horizon of frozen ocean. With activities off the starboard of the icebreaker for solitude and off the port for partying Wally preferred to spend time reminiscing alongside the former.

The Queen's New-Year honours list of 2000 included a knighthood for him. Sir Wally had settled in a remote region of Scotland to continue painting, writing his autobiography, *The Third Pole*, and working on the publication of a book of his artistic works, *The Polar World*.

In the Antarctic he is commemorated by names of a mountain range and a plateau, and in the Arctic the most northern mountain of Svalbard also bears his name. Sir Wally is survived by his widow, Marie, and older daughter, Kari, who has also developed a passion for the polar regions.

Among his nine books are *A World of Men: Exploration in Antarctica* (1968); *Across the Top of the World* (1969); *Eskimos* (1976) and *The Noose of Laurels* (1989). □ **Editor's Note: For more information, see <[www.sirwallyherbert.com](http://www.sirwallyherbert.com)>** □

CONTINUED ON P. 38



## Captain Victor Marchesi

**Telegraph.co.uk, 13 February 2007**—Captain Victor Marchesi, who has died aged 92, was an unsung hero of Operation Tabarin, which secretly safeguarded British interests in the Antarctic during the Second World War.

In 1943 he joined Naval Party 497, under the command of Lieutenant-Commander Jimmy Marr, which left the Thames in a Norwegian sealer. Its crew came close to mutiny before it left the Channel when the chief engineer announced he could pump ship or keep the engines going, but not both. In switching to the troop carrier *Highland Monarch* Marchesi began the first of some 10 transfers of stores and equipment before they reached the Falkland Islands, where he was given command of the former research ship *William Scoresby*.

Accompanied by the Falklands mail ship *Fitzroy*, Scoresby spent three seasons challenging Argentina's territorial claims and preventing German U-boats from establishing bases in the South Atlantic.

Marchesi established a base on Deception Island, in the South Shetlands, the harbour of which was a flooded volcano entered through a narrow, steep-sided gap called Neptune's Bellows. Until inside the harbour he could not see whether it was occupied by an Argentine warship or a German U-boat. "Just as well," he recalled, "because my one handgun and *William Scoresby's* puny bow-mounted gun would hardly have put the fear of death into anyone."

He found cylinders containing Argentine claims to sovereignty, which had been left two years earlier by an Argentine patrol ship, and removed them along with others on the Melchior Islands and the Antarctic peninsula.

Although ice initially prevented a landing at Hope Bay, Marchesi carried out geology, biology and survey programmes in the South Orkneys and South Georgia. In February 1945 a five-man base at Hope Bay on Deception Island, with the Union Flag in place of the Argentines', and an eight-man base at Wiencke Island, off Graham Land, were established.

Both bases operated post offices and when more were founded by the British, with Canadian help, all were resupplied by Marchesi. During this time he wrote several hundred letters to diplomats around the world in furtherance of British claims of sovereignty, though Argentina refused to deliver to embassies in Buenos Aires.

Churchill, who had not been consulted about Operation Tabarin, was concerned that it would upset the United States, whose postwar policy towards Antarctica was uncertain. But he did not prevent the Falkland Islands Dependencies government being set up or the issue of Falkland Islands postage stamps overprinted with "British Antarctic Territories" and "South Sandwich Islands."

At sea Marchesi recalled keeping watch for hours on the exposed bridge of *Scoresby* during icy gales and, when off watch, feeling pain in his hands and feet as his circulation returned. In the winter months Marchesi serviced the remote islands of the Falklands and, for three months each year, refitted his ship in the bright lights of unrationed Montevideo. There he met a talented, multi-lingual secretary in the embassy who contrived a passage to Port Stanley; she was waiting for him when he returned from his third southern voyage and they were married within the hour.

After the war responsibility for Tabarin (the name was taken from Bal Tabarin, a disorderly Paris nightclub) shifted from the Admiralty to the Colonial Office before being finally taken over by the British Antarctic Survey.

Victor Aloysius John Baptist Marchesi was born in London on 25 January 1914. He was brought up by his eccentric godmother, the spiritualist Lady Caillard, who converted the Belgravia Presbyterian church into a private house, which is now Mosimann's restaurant. Marchesi was educated at St Joseph's, Norwood, before joining the Merchant Navy training ship *Worcester* on the Thames. There he slept in a hammock slung from a beam with the name of Henry "Birdie" Bowers, who perished with Scott, carved into it.

Marchesi served some months as a RNR officer in the battleship *Hood* before joining the Brocklebank Line.

As fourth officer in the RRS *Discovery II* in January 1936 he helped rescue the American airman Lincoln Ellsworth and his Canadian co-pilot, Herbert Hollick-Kenyon, from the Ross ice shelf.

The next year Marchesi transferred to the Royal Navy, expecting to be sent to survey the beaches of France before the invasion of Normandy, but was instead dispatched south.

He served two years in the carrier *Unicorn* during the Korean War, lectured at public schools about naval careers, and was senior officer RNRV in Northern Ireland.

In retirement Marchesi worked for Bass, was a port relief officer for Cunard, and captain of the *Cutty Sark* at Greenwich. In 2005 Marchesi recounted the story of Operation Tabarin for the BBC, and his exploits were commemorated in a £1 stamp issued by the Falkland Islands in the same year. He missed by a few months the length of service necessary for the award of the Bronze Polar Medal.

Victor Marchesi who died on December 27, married Nancy Hobbsawn in 1946. She predeceased him, and he is survived by two sons and a daughter. □

## Albert Lincoln Washburn

**Seattle PI Online, by Casey McNerthney**—Albert Lincoln Washburn didn't brag about his days on the U.S. Olympic ski team. Most people didn't know he had lakes and mountains named in his honor. When President Ronald Reagan made Washburn a member of the federal Arctic Research Commission, his appointment was in the news only briefly, and he was glad.

"He was a man who never talked about himself," his son, Land Washburn said. "He was always interested in uplifting the accomplishments of those around him."

Those around for Washburn's final days have a hard time summarizing the career of the Bellevue man who was an internationally acclaimed researcher of arctic structural soil conditions.

Washburn died Jan. 30 after a bout with pneumonia. He was 95.

Born June 15, 1911, Washburn spent eight years of his childhood in Austria, where he followed friends to the ski slopes. Washburn took his talents to the ski team at Dartmouth College—where he studied geology—and in 1935 placed fifth in the National Downhill and Slalom championships at Mount Rainier, qualifying for the following year's Olympics in Germany.

"He thought that it was fun, but there were other things to be done," his son said. "Growing up in Europe and living through the Depression gave him a real solid sense that there are no guarantees in life, and that he had to work hard."

After Army service in World War II, Washburn became executive director of the Arctic Institute of North America, an organization that oversaw a broad range of arctic studies.

Washburn had said he was thrilled by geology, partially because of the possibility of touching field evidence in unexplored regions. "To test the forefront of knowledge for even a brief period, particularly when the subject matter concerned the intimate workings of nature, provided both a motivation and challenge that ... are deep and real for me," he said in a 1988 speech.

Louise Boyd, the first woman to fly over the North Pole, picked Washburn for an expedition to Greenland in 1937, and he explored Arctic Canada the following year.

"When he was doing field research, my mom would literally be taking notes," Land Washburn said of his mother, Tahoe Talbot Washburn. In 1999, she published "Under Polaris," a book that reminisced of their journeys through the coastal areas of Victoria and King Williams Islands.

In 1967, after receiving his Ph.D. and teaching at Yale University, Washburn organized the Quaternary Research Center at the University of Washington, where he was director until 1976.

"His role in the development of the Quaternary Research Center has really paved the way to help us understand how certain processes in the Northwest and

around the world have been evolving over the last 2 million years," said Robert Winglee, chairman of Washington's Department of Earth and Space Sciences. "Through his pioneering work, we now have one of the leading groups in the world for looking at glaciation in association with global warming."

Washburn is survived by his wife of 71 years, his son, daughters Nuna Lincoln Cass and Sila Washburn, two grandchildren and one great-grandchild. Services are pending. □

## Rev. William Menster

**R**ev. William Menster, who said what may have been the first mass in Antarctica, died 14 April 2007 at a care center in Dubuque. He was 94.

Born in rural eastern Iowa, Menster served as chaplain aboard the USS *Mount Olympus* during Operation Highjump. A 2004 video, *South Pole Padre*, chronicles Menster's role in the 1946-47 expedition, when he oversaw religious services for 2,000 men of all faiths. Menster wrote *Strong Men South* (1949) about his role in Highjump.

At Little America on 26 January 1947, Menster led what is believed to be the first mass held in Antarctica, during which he blessed the continent and dedicated it to peaceful purposes. A prayer he composed for the service is engraved on a plaque that hangs in McMurdo station's Chapel of the Snows. □

## Donald Eugene "Curly" Wohlschlag

**Port Aransas (Texas) South Jetty, 17 May 2007, by Dan Parker**—Dr. Donald Eugene "Curly" Wohlschlag, a longtime Port Aransas, died 15 May 2007. He was 88.

Namesake of Wohlschlag Bay on the west side of Antarctica's Ross Island, Wohlschlag helped to discover some aspects of the chemistry of fish that allow them to live in the very cold water of the Antarctic without their blood freezing.

Wohlschlag outfitted the biology labs at McMurdo station from 1958 to 1964. Having a talent for gadgetry, he built much of his own lab equipment. During the 1950s, he pieced together a "metabolism chamber" out of plexiglass and parts from a hand-cranked record player, a long-time colleague remembered. The device measured how much oxygen fish used while swimming. □

## E. Imre Friedmann

Noted astrobiologist Emerich Imre Friedmann died 11 June 2007. He was 85. The Robert O. Lawton Distinguished Professor of biological sciences and Director Emeritus of the Polar Desert Research Center at Florida State University, Friedmann, spent 17 seasons in Antarctica, most of them studying the Dry Valleys, where rich communities of microorganisms colonize the air spaces inside porous sandstone rocks. In 1994, Friedmann Valley in Antarctica's Southern Victoria Land, Antarctica was named in his honor. □

## About Our Back Cover

**The original South Pole station was built as part of the International Geophysical Year (IGY) of 1957-58. The first airdrop of cargo for the station was made on 25 October 1956 by a C-124 Globemaster. In this view of a later airdrop, crews in the foreground prepare to splice trusses that had to be cut in two to enable them to exit a Globemaster dropwell. (Official US Navy Photograph. MCB (Special), Report DF I & II, vol. VI)**



## Membership Letter

Greetings from Maine! It was great meeting a lot of you face to face at the APS symposium in Columbus. What a wonderful event and excellent opportunity for our membership to come together! At the executive board meeting, I presented the APS membership report and would like to repeat some of it here. The state of our membership is good! As of May 1, we have 970 members in the US, 74 Foreign memberships and 166 Library/Institution memberships for a total of 1210 American Polar Society members. We have had over thirty new members since the start of the year and Thomas Noel and James W. Ross have become Lifetime members. Many new members came in as gift memberships, and a half dozen came aboard through our online affiliation with The Antarctic Connection and All Things Arctic websites. Still other members came aboard from the recruiting by existing members. So if you know of someone who might be interested in the society, please contact me and provide contact data for them and I will send them some society information. Thank you to the many who already have passed along names of potential members. And thank you to those members who opt for multiple year memberships, which help keep our postage costs under control. And as always, if you have any questions or comments, please contact me at the email or regular mail addresses for the APS Membership Center. □

### New Members

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Warren Peterson (Medford, WI)

Universitätsbibliothek Gottingen (GERMANY)  
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John Eagan (Birmingham, AL)  
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Thomas F. Noel (Burnt Hills, NY)  
James W. Ross (Goodland, KS)

*Charles H. Lagerbom*  
Membership Chair, APS

**Charles H. Lagerbom**  
Membership Chair, APS

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## Purpose of APS

"The purpose of the American Polar Society is to bring together people interested in research and exploration in the Arctic and Antarctic; to preserve the record of polar research and exploration; and to support and encourage research and exploration in polar and polar-like regions. Toward these ends, the Society will collect and disseminate information about polar regions; compile written records, oral histories, maps, photographs, film and video, and electronic information relating to polar regions; aid organizers and members of polar expeditions; and maintain contact with scientists, explorers, research institutions and interested parties." □

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